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ABSTRACT

The conferences were part of a series on the development of the field of postsecondary education in Britain. Papers of the first conference, on the organization and management of curriculum change, include: present problems of curriculum development (T.J. Russell); the management of curriculum teams (N.C. Clegg, J. Hall, W.P. Jukes, W.T. Jordan); and a discussion of curriculum problems and opportunities in the next five years (R.P. Booth). Papers of the second conference, on technology curriculum, including applied science and engineering, were: trends in the provision of courses in technology (J. Latcham, A.R. Hammond); the Yorkshire idea (of a wide-based curriculum in the principles of technological trades to help alleviate, in part, the lack of apprenticeship training) (G. Birkby); college development and some of the problems of implementation (W.B. Foster); technology, economics, and education (K.J. Shone); introduction to a project to identify trends in technology education and comment on the likely effects on college and department organization (J. Latcham); and an introduction to a project to anticipate changes in technology education in the next five years and identify factors important to planning (W.M. MacQueen). (MSE)

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Coombe Lodge Report

Vol 8 No 6

Study Conference 75/16 and 75/18

The Development of FE III

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FOREWORD

The third in the series of Reports of a number of integrated conferences on the development of FE considers firstly the area of curriculum development and secondly, the future for technology courses in FE.

The first conference reported here aimed to provide senior staff of colleges with opportunities to exchange experience and make themselves more aware of the pressures for curriculum development and of the nature of the skills involved. On the basis of this increased awareness they were invited to examine the problems of the management of curriculum change within the college.

The second conference examined the provision and organisation of courses in applied science and engineering. Particular consideration was given to the problems deriving from a decline in demand in some fields and of expansion in others and associated organisational difficulties.

T J Russell,
Staff Tutor,
Coombe Lodge

THE PRESENT PROBLEMS OF CURRICULUM DEVELOPMENT IN FE

"The main problems of curriculum development are those of uncertainty. Curriculum development may be offered almost as a panacea for all difficulties and in that sense it is a response to change and the uncertainty which accompanies change. The comforting thing about a stable environment is that its demands are known, adjustments to them have already been made and little new thought is needed in order to continue to exist at one with that environment. It now seems that the environment which surrounds and influences the colleges is changing and that the speed of that change is accelerating. The college, as an organisation within a turbulent environment, is itself having to change in response to change outside. It is from these external changes that we in the colleges derive feelings of uncertainty.

The only way in which an organisation like a college can survive is through the process of transaction, taking people in, processing them and turning them out, altered in some way. A difficulty is that different and changing parts of the environment are making different and changing demands on the college in terms of this processing. Another problem is that different ways of carrying out the processing are available to the college, yet we are not certain what they all are, nor how effective they are.

The most important transaction for the college is the processing of students. We traditionally differentiate between different types of students by giving them a label. The type of label which has dominated FE thinking in the past has been for the student intake, CGLI 200 (Hopefuls) and for the successful output CGLI 200s. Those who do not succeed in acquiring the label we call wastage and try to ignore. This kind of labelling has been satisfactory in the past because it has been acceptable to the external environments - the colleges have been filled largely with students who have been sent there by other organisations, so there has been no problem in attracting students. But now, people outside are becoming more demanding in terms of the labels we offer them, and as a result, curious things may happen. For example, a more attractive label may be attached to a course without the actual content being altered. Thus, an 'A' level course may be called 'pre-professional studies'. Yet it is not simply a new label which is really being demanded. It is a different type of end-product and hence a different type of process. The changing demands of students is one of the most important external

changes to which the college has to respond.

demands of validating bodies

Another external pressure comes from validating bodies. These are important as they provide labels for our processes and so enable us to survive. Nearly all of them are changing their views about the kinds of processes which should lead to their qualifications. There are many examples. London University is withdrawing from the validation of courses taken in FE colleges and therefore colleges are forced to turn to the CNAA to validate their degree courses. The CNAA's attitude is that if a course cannot be fully planned before it has started then it may not begin. Much the same applies to the Dip.HE. Ordinary and Higher National Diplomas and Certificates are to be phased out and replaced by TEC awards which will demand a fairly sophisticated form of planning by colleges compared with that needed for the National Diplomas and Certificates. Even colleges which use standard units instead of devising their own will have to justify the way they package them together to create a programme of study. TEC is also taking over a large amount of CGLI work and in its remaining work CGLI is quite clearly going to demand more of the colleges. The intentions of the Schools Council regarding new 16+ examinations are still not clear but it certainly seems that while the Council will continue to provide standardised units, it will expect schools and colleges to do more systematic planning in the way they put these units together to create two year full time courses. BEC is simply an uncertain quantity; and thus adds its own kind of turbulence to the field.

All these validating bodies therefore seem to be moving towards a new examining mode which is more demanding of colleges. An interim stage in this is the development of project work. This, as a form of assessment, involves a great deal of planning and the linking of objectives and assessment to the kind of learning experiences which the students undergo. The whole burden of planning, the design of the award and the experiences leading up to it is being shifted into the colleges. In this way the external environment is pushing the colleges towards internal course design.

Head of Department

This conference is concerned with the management of the internal processes so that external pressures can be coped with more effectively. In colleges the management of curriculum development is not something which heads of departments have generally regarded as their dominant function. They have seen their role as teacher supervision, resource allocation and budget creation. These activities surround and presume curriculum development but it is itself regarded as a minor feature. Environmental changes mean that from now on curriculum development must be regarded as a major part of the role of the head of department. Even if the head of department does not concern himself with it directly, he must manage the process in which others are involved.

Analysis of the Curriculum Process

My colleague, Jack Latcham, and I have attempted to devise some kind of framework for the curriculum process. The focus of our paper * was to try to analyse the process, not in an entirely logical way nor an entirely 'educational' way (although we tried to take account of both logic and education), but in a way which attempts to give some clue to the organisational process. We made no attempt to suggest what education should consist of except in the broad sense that it should make reference to the environment - perhaps try to influence it - but certainly take account of its demands because education is financed by money which comes from the environment.

Curriculum design can be based upon three fundamental questions:

(a) What does the student need to learn?

(b) How should the student learn it?

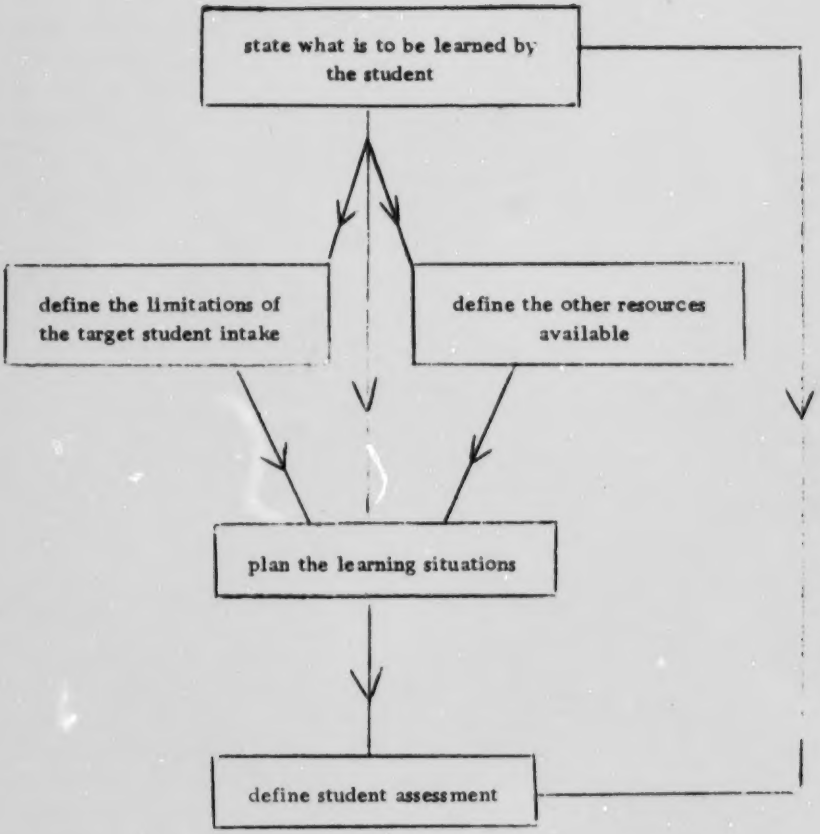
(c) How will we know when, and how well, the student has learnt it?

The first question, 'what does the student need to learn?' is the starting point. It may need to be altered to 'what does the student need to know?' or 'what does the student need to know how to do?' From a management process viewpoint, we tend to treat these as synonymous. The second question, 'how should the student learn it?' is concerned with the organisational package with which the student is provided - in terms of classroom, library, workshop experiences and so on. The third question, 'how will we know when and how well the student has learnt it?' has to be asked because formal education in institutions is costly and it is important to know when it can be stopped. The question does not necessarily refer to certification which tends to have the intention of justifying our statements of how well people have learnt. The organisation needs to ask this question in order to measure how successful the process has been because it is likely to be repeated with another group of students and adjustments can be made to improve it if there is a system of feedback.

With these three questions in mind, various stages in curriculum development can be identified. A basic model for this is shown in Diagram 1.

* T.J. Russell and J. Latcham. An Introduction to Curriculum Development. Coombe Lodge Information Paper. 0940.

Diagram 1

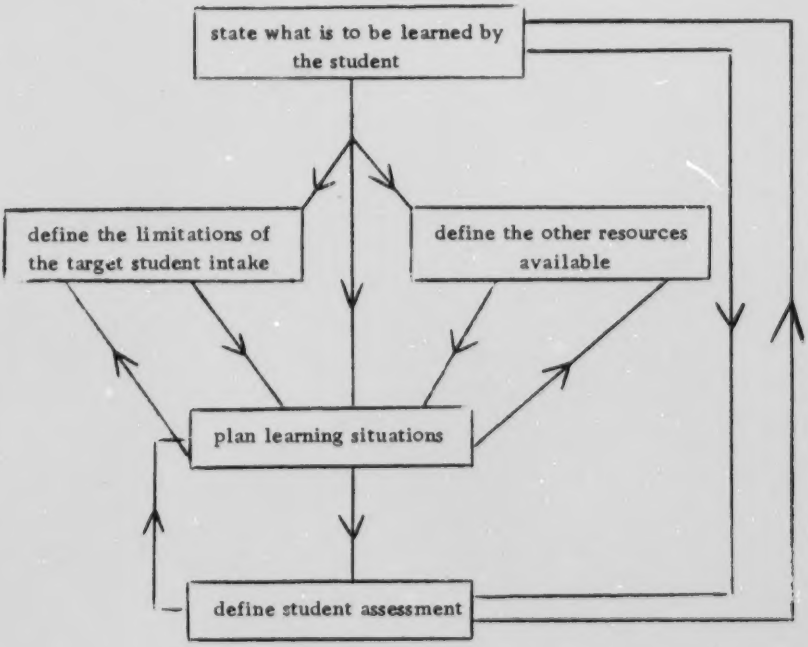

state what is to be learned by the student
define the limitations of the target student intake
define the other resources available
plan the learning situations
define student assessment

In order to decide what is to be learnt by the student, it is necessary to define who the student is. This may in fact give the answer to what he needs to learn, e.g. knowing that a student is a craft apprentice from, say, EMI, will tell us a great deal about what he needs to know. The next question that we certainly need to know when planning an individual lesson, and which could be used in planning a whole course is "what does the student need to know before he starts?" This knowledge, combined with knowledge of the resources available in terms of staff, hours, equipment etc and the knowledge of what we expect the student to have achieved by the time he leaves the course will enable us to define the type of student who can be allowed to take the course. If he does not have sufficient knowledge to qualify for entry, we may either reject him or provide a bridging process to bring him up to the necessary level.

Having sorted out all these factors, we can then go ahead with the planning of learning situations - the organisation of the timetable and so on. Finally, we must plan a form of assessment which is a suitable tool for establishing how well the student has learnt.

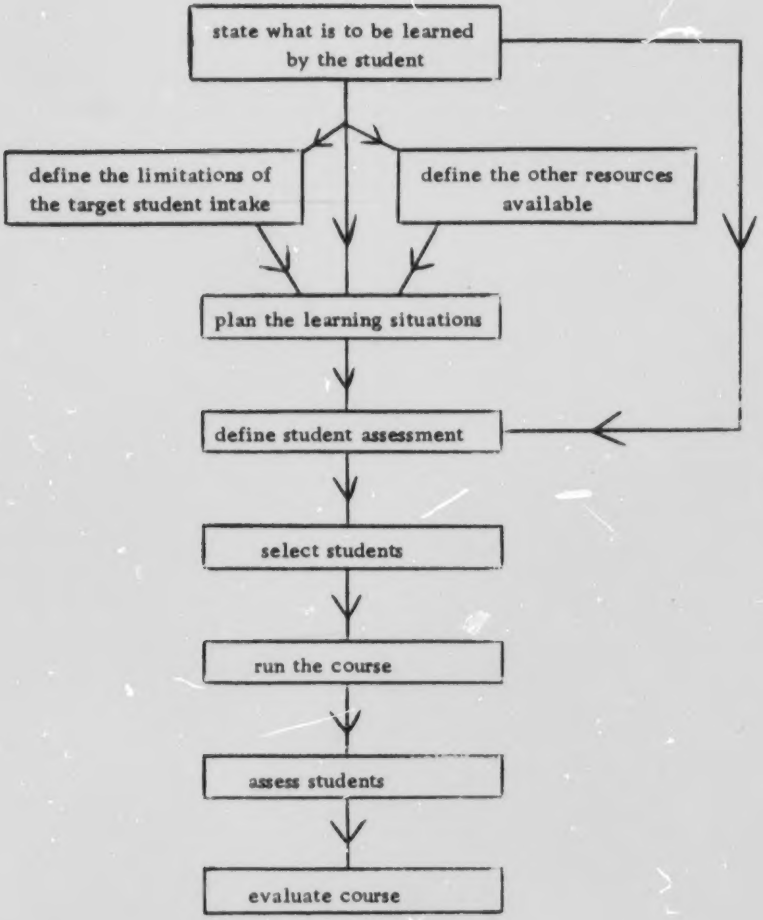
In practice, we do not get each stage right at the first attempt, and modify decisions in the light of subsequent ones in order to get a 'better fit' between the various stages. If feed back loops are inserted, the diagram becomes as follows:

Diagram 2


state what is to be learned by the student
define the limitations of the target student intake
define the other resources available
plan learning situations
define student assessment

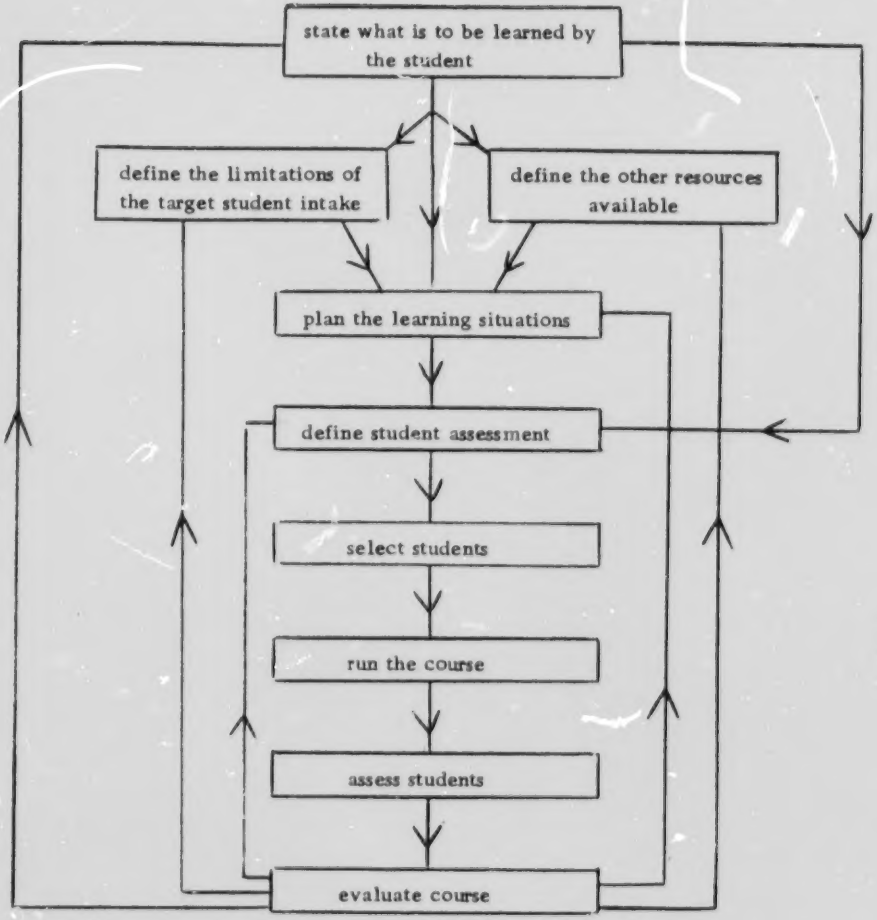
Once the course is underway, further stages centred on student activity are introduced:

Diagram 3


state what is to be learned by the student
define the limitations of the target student intake
define the other resources available
plan the learning situations
define student assessment
select students
run the course
assess students
evaluate course

These stages also give feedback, which takes place continuously, not simply at the end of each course. It is a proces, which tries to achieve closer and closer links between what we want the student to do, how we want him to do it, how we assess him and so on:

Diagram 4


state what is to be learned by the student
define the limitations of the target student intake
define the other resources available
plan the learning situations
define student assessment
select students
run the course
assess students
evaluate course

We must remember that once the basic aim of the course is altered, the learning strategy may have to be revised.

The curriculum development process I have outlined can be applied at three levels of curriculum design; course, subject or single lesson. At the course level we are concerned with the whole pattern of what we want a student to learn, which is often job-related. At the subject level our concern is with clusters of related learning - sometimes called modules or, in the case of TEC, units. These are rarely job-related to any great extent. Whatever is

done at the subject level we recognise as being logically dependent upon the course orientations (often the tensions which exist over general studies arises from vocational teachers' inability to see how such subjects fit into the overall course aims). The third level we may call the lesson level. By this I do not necessarily mean only classroom learning but the smallest learning package which we can coherently plan - it may, for example, be an essay, a project, a library assignment or a file.

All teachers should be accustomed to answering these basic questions at two levels at least. We have many staff experienced in planning at lesson and subject levels. Some also have experience in planning at the course level. It is important to realise that, whatever the level, the process is similar.

In practice, there are five sets of skill areas which are needed in curriculum development, and they are reasonably discrete. While they are connected in educational and organisational senses, it is quite usual for some people to be good at one area, some at another. It is rare for one individual to be very proficient in all these skills - usually a team works on them, and it is important that the division of labour relates to the areas, rather than the resources and staff available. The first two skills areas are concerned with the early planning processes, the others require detailed action once the students are known.

(a) The skill of establishing the initial course aims and the organisational shape of the course (i.e. division into subjects or modules). These are the fundamental skills of the education manager.

(b) The skills of writing detailed learning objectives within each module.

(c) The skills of selecting the most appropriate learning techniques.

(d) The skills of assessment (either for certification purposes or the measurement of effectiveness of the course).

(e) The skills of student selection and induction."

Discussion Arising

One member felt that Mr. Russell had ignored the fairly substantial amount of curriculum development which already took place in colleges. Was this because it had been tailored to fit into existing structures, and rarely involved the design of completely new structures? Mr. Russell said that curriculum development had until now been largely restricted to those areas in which the validating bodies themselves had taken little interest, such as general studies.

The discussion then turned to the broad question of the merit of colleges devising their own schemes. Some people suspected that it was an attempt by the validating bodies to save money - and thought that in any case, this was a mistaken philosophy, because it would cost more, overall, for each college to be involved in the design of its own courses and examinations. Others envisaged internal opposition from staff who simply wanted to get on with teaching, and not spend time on curriculum development. Other members put forward views which supported curriculum development by colleges. One participant noted that it was being demanded by employers, who regarded the old courses as irrelevant to their needs. Another said that it was in line with current thinking that workers should have more control over their activities. Mr. Russell thought that the educational reasons for curriculum development at college level were strong. It was a sign of the increasing professionalism of teachers that they wanted to be involved in curriculum decisions. It was also an aspect of the growing awareness that there should be a closer link betweeen aims, processes and examinations and that this could be more easily achieved if decisions on all three were made by the same group of people.

On the question of students' needs, a member pointed out that one of the demands made by students was for qualifications which would have national currency, and this imposed standardisation on the colleges. Mr. Russell accepted this, and drew a parallel with the situation in schools, which are limited by the demands their students make for GCE and CSEs. Nevertheless the question "what does the student need to know?" should still dominate for the students need certain skills and knowledge before they can do a job, and this was certainly as important, if not more important, than possession of a certificate which has national currency.

Finally, the discussion moved on to the issue of conflicting demands from various influences in the environment - the community, students, industry, professional bodies, college governors and so on. Some system of priorities therefore had to be decided.

Towards the end of the conference, an open plenary discussion was held with representatives of two contrasting colleges which are encouraging their staff to become actively involved in curriculum development. Shirecliffe College of Further Education was described by Mr. J. Hall, Principal and Mr. W.T. Jordan, Vice-Principal, and the situation in North Nottinghamshire College of Further Education was outlined by its Principal, Mr. N.C. Clegg and the Head of Department of Mining Engineering, Mr. W.F. Jukes. As the discussion progressed it became apparent that while the two colleges were very different types of institution, both realised that in order to have successful curriculum development it was essential to have a healthy environment and sound staff morale and for the management to be extremely sensitive to the needs of staff for staff development activities.

Shirecliffe College of FE

Opening the discussion, Mr. Hall spoke first of the influence of the staff at the chalk face - those who did the actual teaching - on change. Referring to the paper given by Mr. Russell, Mr. Hall said that this described curriculum development activities which were the responsibility of the professional teacher. However, he did question whether an individual teacher would be capable of sustaining all these activities throughout the academic year.

Mr. Hall then listed the priorities of any educational establishment in their order of importance:

(a) the credibility of the output (i.e. the students);
(b) accountability in achieving the output;
(c) the institution's ability to initiate changes in a curriculum;
(d) a course structure designed to ensure integration of subject matter; and
(e) a team of teachers associated with the above items to offer stability to their students' courses of study.

Mr. Hall said that all these items assumed a total involvement and conviction by the teachers at the chalk face. He was unwilling to become involved in a discussion about the inadequacies of teachers or the system as this would detract from his main aim - to investigate whether it was possible to set up a model which allowed some of these priorities to be incorporated into the

management structure of a college, which allowed access to national or regional developments which seemed worthwhile and which created a management structure which was sympathetic to some of the problems presented in the management of learning. Mr. Hall explained that by 'management of learning' he referred to the professional teacher's management of learning situations through CCTV, programmed learning, objective testing, or any other learning methods appropriate to the particular student group. Thus, in curriculum development, a great onus was placed upon the teaching staff. On the subject of assessment, Mr. Hall said that the credibility of assessment of students' achievements was to a large extent dependent upon support for these methods from the industries which employed the students.

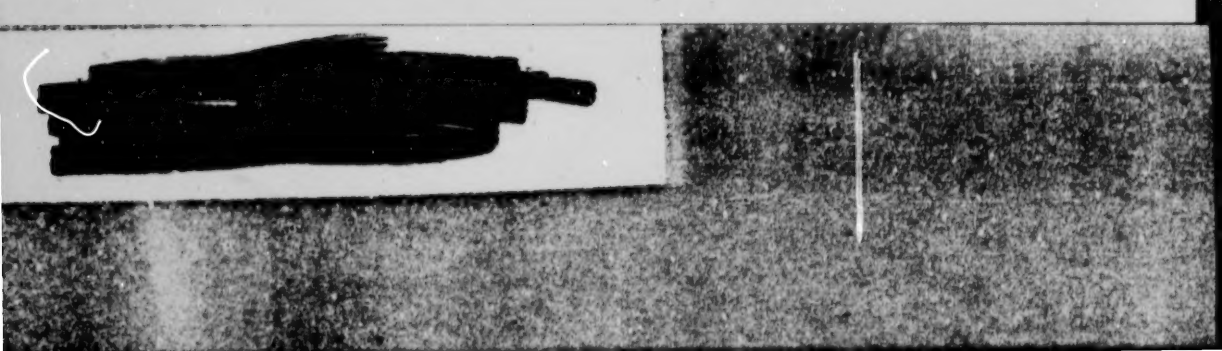
curriculum development mechanism

Mr. Hall then described the mechanics of the organisation of curriculum development which had developed at Shirecliffe, basically a monotechnic building institution although a second faculty was beginning to emerge in the field of social health and welfare. The college was one of four in the city of Sheffield in addition to the Polytechnic and had about 100 teaching staff who were organised into study groups. Diagram 1 illustrates the consultative and policy making machinery of the college. There was a strong commitment to Circular 7/70. The Academic Board, chaired by the Principal had direct access to the Governing Body. The Academic Board was divided into two committees - the Educational Resources Committee, chaired by the Vice Principal and the General Purposes Committee, chaired by the Chief Administrative Officer. Both these Committees had Sub-Committees comprising (a) Learning Resources, Laboratory and Technician Services and Staff Development in the case of Educational Resources Committee and (b) Refectory and Safety Committees in the case of General Purposes Committee.

A further Sub-Committee of the Academic Board was the Staffing Committee, chaired by the Principal. This Committee comprised the Vice-Principal, Departmental Heads and staff representatives from each of the four departments.

The college had contact with the industries it serves through consultative committees which had representatives from industry, polytechnics, universities, other educational establishments, trade Unions and other agencies.

In addition to the Academic Board, there was the Management Committee which comprised the Principal, Vice-Principal, Chief Administrative Officer and Heads of Departments. This Committee was responsible for the day to day management of the College within the framework of the Academic Board Policy. The non-teaching staff was represented on the Academic Board by two of its members and informally by the Chief Administrative Officer and Vice-Principal. The ATTI Branch was considered to be an essential part of the Consultative Machinery.



"Diagram 1"

Consultative and Policy Making Machinery

Within each Department academic staff were organised into course study groups - teams of teachers who met to develop the curriculum and identify resource needs. The objectives of the study groups were:

(1) To develop an integrated curriculum plan.

(2) To identify (a) general course 'learning objectives'
(b) specific course 'learning objectives'

(3) To identify all the resources required to achieve the objectives of the planned course.

(4) To identify the methods by which the teaching team would assess the students' progress in their courses of study.

(5) To ensure that all the examination procedures were adequately understood and managed.

Given this brief, all teachers were placed in a position of responsibility for curriculum development. But of course, our staff were in fact no different from any others - among them were people who are enthusiastic to use the machinery to improve the curriculum, people who showed no interest in such activities, and people who fell somewhere between these two extremes.

Finally, Mr. Hall identified a major development. For the first time in the history of FE, a national agency (TEC) had been set up to ask teachers what they wished to see in a course of study rather than providing a ready-made course for them to use as operators. Teachers were now expected to function as professionals, feeding back information and creating courses on the basis of what they perceive is needed.

Following Mr. Hall's description of the College, Mr. Jordan added that one further novel element in the otherwise fairly traditional administrative machinery was the existence of the Central Resources section on the academic side, which acted in a service capacity to the four Departments. The Technician Services were administered centrally through the Vice-Principal and Chief Administrative Officer.

North Nottinghamshire College of FE

Mr. Clegg then described North Nottinghamshire College of FE, which is situated on the borders of Nottinghamshire, Yorkshire, Lancashire and Derbyshire. This in itself created certain difficulties, for there is a natural tendency for attention to focus on the centre of counties, and therefore the college had to work hard simply to survive. The college served a rural and semi-urban area and tried to fulfil the needs of that area. By tradition, it was an intense coal mining district, and this industry was thriving, though other industries also existed. Thus the college was largely a local institution which tried to meet the demands of the mining, engineering, construction and

scientific industries in the area, particularly at craft and technician levels and also provided basic training courses for these industries. The college also had a few regional responsibilities mainly in advanced mining courses. It served the adult education needs for most of the area, and in addition to general adult education provision offered services to hospitals and other residential institutions. The college also had a tertiary side, for GCE 'O' and 'A' level courses were thriving. A recent decision to surround the college with all-through comprehensive schools was, however, going to create an area of conflict over 16-19 provision. A major recent innovation - and an important area for curriculum development - was the introduction of programmes of study for handicapped young people. The main purpose was to prepare them for work, as when they first came to the college most were classed as unemployable. The college saw its role as making them employable, finding them a job and trying to ensure that they retained the job.

departmental organisation

Mr. Clegg then described the departmental structure of the college. All the departments were interdependent. Thus the mining engineering department used the facilities of the engineering department and itself serviced the work preparation unit (for handicapped students) Mr. Clegg said that once departments were interlocked into interdependent structures, teaching teams also worked co-operatively. He emphasised that the general culture of the college had an important effect on the success of curriculum development. Where possible, the college tried to promote group participation in decision making. But in order to respond quickly to pressures currently being placed upon the college as a result of the climate of financial stringency, it was necessary to move, by agreement with the staff, to straight consultative management.

Finally, Mr. Clegg identified some of the main areas of curriculum development in the college. Firstly, there was retraining for the mining industry. The local mining areas were going through a period of rapid expansion, and the mining engineering department had to respond quickly to the needs of the industry. In this area, curriculum development often had to be carried out at short notice. Secondly, the programme to give the handicapped limited skills and operative training was still developing. Last year, deaf students came into the college for the first time. Thirdly, in connection with the college's interest in work for the disadvantaged, Borstal boys were being brought into the college to attend open courses and staff were also going out to Borstal institutions. Two very recent developments were an attempt to develop a TEC complementary studies programme for mining students and the development of a programme for the parents of handicapped youngsters which attempted to help them with their responsibilities. Work had been going on in this area for two years and it was hoped that next year a course could be mounted.

handicapped students

Following these brief descriptions of the two colleges, a more general discussion took place which centred on two main themes - provision for the handicapped and staff development. Mr. Clegg explained that at North Nottinghamshire curriculum development for courses for the handicapped had been on an ad hoc basis. Initially only six students were taken, and these were people who were fairly mobile. As it was a completely new departure for the college, no detailed plan was worked out. Over the year's course the students gained confidence and grew in maturity so the following year ten youngsters with more severe handicaps were brought into the college and a specialist tutor was appointed. At this stage real curriculum planning got underway, although often it was a case of trial and error. Gradually the intake was increased to the present figure of 120 students and the work was widened to involve technical departments. Some of the teachers in the technical departments were given training in teaching the handicapped. Now there was a specialist team of non-technical staff who were all experts in working with various types of handicap and these were integrated with about 30-35 staff from technical departments. The courses they followed had to be individually tailored to suit each student, as they all had different, and often multiple, physical and mental handicaps.

Mr. Clegg was asked whether there were problems with staff who were not involved in teaching the handicapped students, who, while they showed normal human sympathy, were unable to accept the disturbances that sometimes resulted - e.g. the noise generated by emotionally disturbed students. He replied that this could be a difficulty but it was minimised in two ways. First, the unit had grown gradually, so there was not a sudden arrival of over 100 handicapped students - people had had time to accustom themselves to the idea of having these students in the college before they formed any sizeable proportion of the student body. Secondly, the intake of certain types of handicapped students was limited to the number that the college knew it would be able to cope with. There had been some problems, however, with students who were not handicapped finding it difficult to mix with the handicapped students.

On the issue of physical resources for the handicapped students, Mr. Clegg said that this lagged behind course provision. For example, some of the students with spina bifida could not get up to the second floor of the college as there was no lift. It had taken four years for the college to be able to appoint a nurse - and initially this was only achieved by employing one as a tutor.

Mr. Hall then described the work being done with handicapped students at Shirecliffe. For the past year a course for the instructors of both the physically and the mentally handicapped had been under preparation. Mr. Hall referred to legislation four years ago which had given the social services, in consultation with the education service, responsibility for the education of young handicapped people. This had created a new task for FE - to attempt to make up for the missed opportunities in the education of these students at earlier stages in their

lives. Four colleges in the city of Sheffield undertook a total investigation into their competence to take in, and where possible, integrate handicapped students into other courses. This had led to such developments as totally deaf students taking plumbing and heating and ventilation courses alongside non-handicapped students.

For the last twelve months college staff had liaised with the staff of day centres for the mentally and physically handicapped to devise a curriculum for these students. It was important to acknowledge that each different type and degree of handicap required an individually tailored programme and that it was impossible to create in advance a detailed curriculum that would last the whole academic year. Detailed planning could only be attempted once the individual students were known. With regard to physical resources Shirecliffe appeared to be rather more fortunate than North Nottinghamshire. As it was taking much responsibility for provision for the handicapped in Sheffield it seemed likely that the DES would permit a new building programme to go ahead so that the college would be able to accommodate wheelchairs and cater for other needs of handicapped students.

staff development

Responding to a question from the floor, Mr. Hall described the staff development policy at Shirecliffe. While there were many excellent teachers in FE who had never received formal training, it was the college's policy that all academic staff should have some pedagogical training. The only staff who were not trained, undergoing training or intending to train were senior staff in their late '50s who were already proven colleagues. At all times 5% of the academic staff were attending Huddersfield College of Education Technical. Staff normally attended full time, as it was thought that sandwich courses created divided loyalties. The nearby university was also used for staff development. Mr. Hall agreed with a suggestion from the floor that it would be an advantage to have a professional tutor within the institution to co-ordinate and supervise the training programmes staff were taking. Replying to a question about the staff development sub-committee of the academic board, Mr. Hall said that it had the responsibility of recommending to the academic board those staff who should attend courses of study. Its chief function was to ensure that curriculum development was promoted and to create a dialogue within the college about educational matters. One of its activities had been to try to attract part time staff to become involved in curriculum development and this had been surprisingly successful.

industrial liaison

Finally, Mr. Jukes spoke about the relationship which his department had built up with industry. The college tried continually to keep abreast of new developments, and departmental staff visited pits to discuss training needs with all levels of worker. Having identified needs, curriculum development could begin, and courses of various length could rapidly be designed. As industries saw that the college was anxious to serve their needs, they were very helpful and sometimes provided the college with equipment.

PROJECT

"To consider the problems and opportunities for curriculum development in further education colleges during the next five years. The focus of concern will be the organisation and management of the curriculum process"

Syndicates

Much of the work of the conference took place in syndicates. Groups discussed a variety of topics concerned with curriculum development. The discussions began with a consideration of papers prepared by some of the conference participants describing developments taking place in their own colleges. Then each syndicate discussed, in detail, some of the five skills areas identified by Mr. Russell (see page 313). Following this, syndicate work was directed towards developments in various types of examination. Representatives of TEC, CGLI and the Schools Council visited each group to answer questions about developments in their own organisations and Colin Turner discussed the Dip.HE with the syndicates. During the final part of the conference the syndicates formulated strategies for the management and promotion of curriculum development within the institution and presented their findings to Professor Dowdeswell of the School of Education, Bath University, in a final plenary session.

Witnesses

Some of the points made by the visiting witnesses in discussions with one of the syndicate groups are outlined below:

R P Booth, Senior Educational Adviser, Schools Council

Mr. Booth began by describing some of the general trends current to Schools Council thinking in relation to curriculum development. The Council was moving away from nationally mounted curriculum development projects towards initiative at a local level. For example, a teachers' centre trying to cater for local needs might appeal to the Schools Council for help. The Schools Council also had to consider changes in examinations in schools to make them more suited to the changing curriculum. Three developments were under consideration, a common examining system at 16+, the 'CEE' and 'N and F' levels. CEE (Certificate of Extended Education) proposals arose from the fact that the number of students in sixth forms, sixth form colleges

and tertiary colleges had grown over the last few years. There were now about forty or fifty thousand 'new sixth-formers' for whom GCE 'A' level courses, geared mainly to university entrance were unsuitable. At present many of these students spend their time taking GCE '0' levels and CSEs and many teachers feel that these are not acceptable for people in the 16-18 age range. Mr. Booth explained that the CEE was designed as a year's course on a single subject basis, and could be combined with GCE '0' level and 'A' levels The target group would be those students who achieve CSE passes at grades 2-4.

and tertiary colleges had grown over the last few years. There were now about forty or fifty thousand 'new sixth-formers' for whom GCE 'A' level courses, geared mainly to university entrance were unsuitable. At present many of these students spend their time taking GCE 'O' levels and CSEs and many teachers feel that these are not acceptable for people in the 16-18 age range. Mr. Booth explained that the CEE was designed as a year's course on a single subject basis, and could be combined with GCE 'O' and 'A' levels. The target group would be those students who achieve CSE passes at grades 2-4.

Mr. Booth then spoke about the 'N and F' proposals for an examination at two levels taken after two years in the sixth form. The examination would be in five subjects and students would normally take three subjects at 'N' level' (approximately equivalent to half an 'A' level) and two at 'F' level (roughly equal to three quarters of an 'A' level). The target group would be those students with four 'O' levels or CSEs in high grades. The purpose of proposals was to develop the sixth form curriculum into something broader and more acceptable to the entire age group, rather than simply those aiming at university entrance. The Council was making these proposals in response to criticism made by teachers of the present system. In view of the comments received about the new proposals, the Governing Council of the Schools Council had decided to undertake a feasibility study. In 16 subject areas steering committees have been set up. Their terms of reference are to commission groups, and possibly GCE Boards, to design syllabuses for N and F examinations. While the work of the Schools Council was, of course, directed mainly at the schools, all the steering groups had FE representatives among their membership. Ewell College of FE, which was developing an OND course in social science, had already shown an interest and offered to use 'N' level syllabuses developed by the steering group as part of the OND course.

Mr. Booth was questioned on the wisdom of frequently changing examination systems and curriculums. He answered by making reference to developments which had taken place in the field of science in schools. Here curriculum development had begun in earnest as long ago as 1962 when the Nuffield projects began. The impetus to reform the teaching of science had come from the teachers themselves. The first development was the division into separate subjects at 'O' level. Then, as the comprehensive schools developed, it became necessary to teach science to non-grammar streams, so the Nuffield Secondary Science projects developed. Early comprehensive schools were often arranged in mixed ability groups, therefore it was relevant to do some combined science for two or three years in the younger forms. Then it was realised that many 'O' level students could not fit three science subjects into their timetables, so Schools Council Integrated Science Projects were developed. In this way, Mr. Booth argued, changes in curriculum and examinations were a response to changes which were already happening in any case.

J Twining,
Assistant Director,
TEC Unit,
CGLI

Mr. Twining provided members with a paper which suggested some ideas relating to TEC's approach to curriculum development and which is printed below.

The Development of TEC Programmes

1. Aims of programmes should be related to:-

   (a) Needs of technician in industry;
   (b) Needs of technician as an individual.

   A well-designed programme will reconcile the conflict between these aims.

2. Needs of a technician in industry include:-

   (a) Immediate needs of specific employer;
   (b) Medium term needs of industry as a whole (i.e. for job mobility within industry as we know it);
   (c) Longer term needs of specific employer and of industry as a whole (i.e. for job mobility in industry as it may become);
   (d) Career prospects and progression to attract and retain suitable manpower without creating "all chiefs no indians" frustration.

   A well-designed programme will reconcile the conflict between these needs.

3. Needs of a technician as an individual include:-

   (a) Motivation to get most out of learning situation;
   (b) Preparation of educational base for further study;
   (c) Broadening of education for citizenship;
   (d) Technical requirements as perceived by the employer;
   (e) Technical requirements as perceived by the profession;
   (f) Educational opportunities as perceived by the teacher;
   (g) The need to succeed.

   A well-designed programme will resolve the conflict between these needs.

4. Programmes have to be designed within constraints which include:-

   (a) time;
   (b) resources;
   (c) the educational system as we know it;
   (d) differences in student abilities.

   A well-designed programme will be operable within these constraints.

5. The constraints of time include:-

(a) The length of time for which a student may expect to be released from work to study (e.g. length of apprenticeship);
(b) The amount of study that can usefully be included within a day;
(c) The amount of study that a student is willing contribute from his "leisure" time;
(d) The ground to be covered to reach the required standard from the student's starting point.

A well-designed programme will be operable within these constraints.

6. The constraints of resources include:-

(a) resources for creation and modification of programmes;

(i) central
(ii) regional
(iii) local
(iv) industrial

(b) resources for the operation of programmes;

(c) resources for monitoring the standard of programmes.

A realistic approach to programme development accepts that in the present national economic situation these resources are unlikely to be greatly expanded - and will often even be reduced from existing levels.

7. The educational system divides authority and resources between:-

(a) Central Government;
(b) Central Agencies (e.g. TEC);
(c) Local Authorities acting together regionally;
(d) Local Authorities separately;
(e) Individual colleges.

A realistic approach to programme development has to accept this division of responsibilities and effort.

8. Existing technician courses tend to separate students according to abilities judged by previous school achievement and academic potential (particularly in the field of mathematics). A well-designed programme will cater for mixed abilities in this dimension. But is this adequate? Are there not other abilities on which a technicians potential should be measured, e.g.

(a) handling of abstract concepts;
(b) three-dimensional perception;
(c) communications;
(d) organisation and administration;
(e) problem solving;
(f) analysis and synthesis.

Can programmes be developed to take into account differences in students' abilities in these dimensions?

9. A well-designed programme will not only resolve the conflicts outlined in paragraphs 1 - 3 and operate within the constraints outlined in paragraphs 4 - 8 but also achieve complete industrial and professional acceptability - and acceptability to the students. How?

The syndicate discussion began with some questions about CGLI, and later attention was turned to the development of TEC. First, Mr. Twining was asked to describe how CGLI's approach to course design had developed over the years. He said that until the 1920's university staff designed the syllabuses, but this resulted in their becoming too academic so a system of advisory committees was set up. Members were professionals and covered a wide range of specialities. Over the last few years knowledge about learning had advanced and this had led to a more analytical approach to curriculum development. There were three main aspects to this analysis. First, account was taken of what industry wanted. Then, an analysis was carried out to see how far educational provision ran parallel to the training programme given within industry - this was more valid for craft level work. From this information a model could be built up, and this would be tested on a wide range of people and adjusted until it seemed most effective.

Some points were then raised about external constraints on course design, in particular the unreasonable demands made by some professional bodies. Mr. Twining said that TEC had held discussions with many professional organisations especially the Engineers Registration Board. While they had the right to say that they did not find the TEC award an acceptable qualification for membership, an advantage of TEC operating on a unit system was that students could take a TEC course plus additional units which would qualify them for membership of a professional body, without the entire course being distorted for the sake of a few external bodies. Mr. Twining added that it was impossible to create a system which would completely satisfy all conflicting demands. Moreover, a system which seemed excellent in 1975 might have to be changed to meet new aims and priorities a few years later.

The attitude of TEC to pilot schemes was the next issue to be raised. Mr. Twining cited two reasons why he thought the Council was not enthusiastic about them. Firstly, there was a political reason. As a result of the way decisions were made on the location of courses and so on, pilot schemes were not welcomed by those who were not included in them. Secondly, there was the time factor. If a pilot scheme is run for a two year programme, then it is not possible to apply lessons learnt from it until the end of the second year, and it will probably be four years before all the feedback has been processed and other courses are properly underway. By this time requirements will have probably changed.

Mr. Twining was then asked if TEC would allow changes to be made to suit rapidly changing situations. He replied that the TEC system would allow colleges to be more sensitive to changing local conditions and make changes to cater for them fairly rapidly - certainly the TEC system was more flexible than the present system.

I E G Miller, Research and Development Department, City and Guilds of London Institute

Mr. Miller spoke to the syndicate about the development of the CGLI Foundation Courses and the progress of the Feasibility Studies now underway in several institutions. The project was started as a result of requests received by the CGLI from schools and colleges over the last few years for a vocationally-oriented course suitable for those students wishing to remain in full time education but not working towards GCE examinations. With the raising of the school leaving age the demand grew and so the CGLI decided to set up Feasibility Studies, as a first step in the development of a suitable curriculum, to explore the needs of these students and the methods by which these needs might be met. Currently participating are 12 colleges and 2 schools with 335 candidates between them. It is hoped that next year 70 institutions and about 100 courses will be involved. Schools and colleges who wish to take part are free to choose their own teaching methods, syllabus content and assessment methods subject only to the approval of an external assessor. The target group consists of students who may have taken CSE but no specific entry qualifications are required. The course aims to bring students from a vague identification of the broad career area in which they would like to work (e.g. 'with people') to a more mature commitment. It is not intended to be a sampler course, however, but a spectrum of compatible vocational studies integrated with general education. In Foundation courses where it is envisaged that all topics will be closely inter-related, the distinction between general and vocational education may be somewhat arbitrary but the following weighting gives some idea of the balance to be aimed at over the course:

Vocational Education	-	2/5;
General Education	-	2/5;
Extra-mural activity	-	1/5.

Asked to define the standard that students would be expected to reach on completion of the course, Mr. Miller said that at this exploratory stage of the project there would be no uniform national standard, because of the different ages and abilities of the students. Some could be 15+ and still in school, others 16+ and at college and there could even be some of 16+ who were at school. It was hoped that these differences could be indicated on the Certificate. A member from North Yorkshire felt that the courses should only be offered to 15 year olds. Older students might have difficulty finding jobs as employers tended to reject applications for apprenticeships from people over 17 years of age. Mr. Miller thought that regional differences probably affected the employment opportunities and this would not be the general

pattern. Students leaving the current schemes being offered in colleges had been offered apprenticeships. Mr. Miller agreed that acceptance by industry was of considerable importance and this was why the Institue valued so highly the comments made by the Training Services Agency in the course of their continuing contact with the development of this project. Indeed, many of their suggestions had been incorporated into the Institute's latest discussion document.

C M Turner,
Staff Tutor,
Coombe Lodge

The session began with Mr. Turner giving a brief summary of the history of the Dip. HE. It had first been suggested in the James Report as a means of diversification for the colleges of education. By the time the Government White Paper was published 12 months later in December 1972 the emphasis had changed. The White Paper envisaged the Diploma being offered at all types of colleges and serving two purposes. Firstly it could be a two year course leading to a terminal qualification. Secondly it could lead on to further study which would culminate in a degree or professional qualification.

In the event, it had proved difficult to plan courses which would satisfactorily fulfil both these functions. Last year nine institutions had received DES approval to submit schemes and seven of these had sent course submissions to the CNAA. Of these only two were approved and started in September 1974. One of these, at North East London Polytechnic, was very radical. The other, offered at Berkshire College of Education was rather more conservative. The remaining schemes, most of them related to courses which were already running in the colleges, have been re-submitted to the CNAA. The scheme submitted by Wolverhampton Polytechnic is ab initio, and has now been approved to start in September 1975, when it is expected that about six or seven new courses leading to the Dip. HE will be offered.

Mr. Turner then pointed out one of the major dilemmas concerning the Diploma - would it really be marketable as a terminal qualification, and, if not, how easy would it be to link it to existing schemes of education? If it was expected to be a qualification in its own right, how justifiable was it to make the Diploma the first half of an existing degree programme? At present many students and teachers were wary of the Dip. HE because it held no guarantee that students would be able to proceed to a degree course if they so wished. On the other hand, every new type of course was bound to be greeted with such caution until it became established and accepted. Many employers might actually prefer to take recruits who had taken two years of general education rather than a three year degree in rather obscure subjects.

A member commented that one of the greatest advantages of the Dip. HE had been the impetus it had given to curriculum development in various colleges. In some colleges it had led to the setting up of new college structures in order to achieve co-ordination of different subject areas, as at Crewe Alsager, and NELP had created a curriculum based on student-defined programmes.

The session ended with a discussion of the difficulty of designing a Dip.HE course with a modular structure which was both academically acceptable and economically viable. While modular structures were welcomed because they provided maximum subject choice, it could be at the expense of students' choice of subjects.

Syndicate Reports

On the final day of the conference, the syndicates presented their main conclusions to Professor W.H. Dowdeswell.

Two groups began their reports by remarking that while curriculum development was vital, it was possible to attach too much importance to the theory and defer facing the practicalities of the problem. Curriculum development took place, even if not very successfully, in any case, so perhaps the process required was one of modification rather than invention.

stages of curriculum development

A number of groups listed the various stages of a curriculum development strategy. According to one group the stages should be:

1. The Initial Idea.

This could emanate from any level and in an informal context. The syndicate noted that it was important to note that a major management role, e.g. at Head of Department level, was to recognise that change may be necessary. There were various ways in which this might come about, and it might be no more than the development of an idea in the course of a conversation. At this stage the initial idea may be modified or abandoned and it may or may not be documented.

2. Fuller Examination

A fuller examination of the initial idea should take place probably in discussion with other members of the management team. Again, it may be decided to modify or abandon the project.

3. Desirability and Feasibility Study

(a) The syndicate agreed that management should give encouragement and enthusiastic support to those carrying out the detailed examination of the desirability and feasibility of the development.

(b) Careful selection of the team for this work was of prime importance.

(c) On receipt of the report the decision should be made on whether or not to proceed to full implementation. This would be done not only in the light of the recommendations but bearing in mind other college committments. It would probably be considered by the academic board at this stage.

4. Full implementation

(a) All staff, whether or not directly involved, should be informed. Interested staff should be invited to participate, and every attempt should be made to 'tap' the extensive staff resources available within the college. The syndicate noted the vital importance of ensuring the readiness of staff to accept change.

(b) A programme of staff training in curriculum development should be set up for those not already familiar with it.

(c) Decisions should then be made on the organisational structure and membership of groups which will carry out the work at course, subject and lesson level, across departments.

(d) A project co-ordinator should be appointed.

(e) While many colleges would have staff willing to give their services without a time allowance, a major curriculum development project would involve many staff hours and a reduction in class contact time would probably be necessary. Decisions would have to be made on the total hours available each week and their allocation. In view of the present economic situation a decision might have to be made on whether to cut other courses.

(f) Timetabling would have to be arranged in such a way as to allow teams of staff to work together.

(g) The co-ordinator and his team must be allowed autonomy within their brief and should be encouraged to monitor their own progress.

The group included in its report a number of other points which would have to be considered by any college involved in curriculum development

(a) Staff would need assistance with new teaching techniques.

(b) A resources centre would have to be developed interdependently with curriculum development at the lesson stage.

(c) Staff would need assistance with new assessment procedures.

(d) It would be necessary to keep a watchful eye on other activities in the college to ensure that they were not neglected.

In discussing the various stages of curriculum development another group reported that the initial identification of requirements and obstacles in the way of achieving these requirements was the most difficult, and certainly the

most important problem, because once these were known, the rest followed. The syndicate noted that in particular cases it may be necessary to ascertain the actual work being done by former students in the discipline under consideration.

range of people involved

Possibly the teaching staff should decide which educational elements are relevant for that task, not only industrialists. Equally, industrialists may have valid opinions about areas of the syllabus which teachers tend to guard as their own private territory. The duration of a course, which determined to a large extent its cost to employers and the community, should be the subject of discussion between teachers, employers, students, and other interested parties. The syndicate suggested that discussion on the curriculum should involve anyone who could possibly assist - trade unions, advisory committees, governors and so on. As great damage could sometimes be done in an operation of this kind by apparently trivial, ill-conceived action, sometimes a very close control of members of the team by some official diplomat would be required.

revision

The syndicate stressed the need to revise the scheme repeatedly in the light of comments from staff until opposition died down. But at no time should the original aims be departed from unless there was evidence that they were incorrect.

management functions

Another syndicate concentrated on identifying the management functions at each stage in the curriculum development process. At the initial stage of determining the need for curriculum development, in the case of needs arising from an external source, it was the function of management to ensure that enough was known about the type of students, their present level of educational attainment and their expectations. It was necessary to be aware of the time available for preparation prior to the date of commencement of the course. Consideration had to be given to the availability of appropriate resources in terms of accommodation, staffing and equipment. Management problems concerned with the revision of existing courses lay in the area of developing a climate for encourgement of revision within the department so that they occur naturally when the need arises. On the other hand, the rewriting of existing courses might be due to outside influences. Therefore the main management consideration was to ensure that staff, employers and students were made aware of the implications, particularly in the case of students from industry where education and training were complementary.

With regard to the writing of learning objectives, the role of management was to ensure that there was a precise and lucid statement of the learning intention. This should include reference to the student, his learning environment and the behaviour desired of him after the learning experience.

In the area of assessment, the group felt that managerial problems fell into three main areas:

(a) Identification of the method appropriate to each aspect and stage of student development.

(b) Staff development such that methods selected may be used to best effect.

(c) On-going administration/recording of results and reaction to information thus gained.

Head of Department

The syndicate concentrated to a large extent on the role of the Head of Department. Assuming he was the team manager, he would act in a supportive role. His main problems would be:

(a) Sensitivity to the needs of the group (teachers and learners).

(b) Selection of the teaching staff and supervision of technicians and support staff.

(c) In many areas of work, particularly CGLI Mode 1 courses, he would need to develop means of evaluating the course other than by examination feedback. The examiners' reports are not available until the December following the June examinations which is too late.

(d) To prevent undue emphasis in the various areas suggested by the curriculum development model. Staff requirements for resources tend to be extravagant. The Head of Department may need to exercise discretion in modifying demands without discouraging enthusiasm.

(e) He would need to be aware of the different time scales necessary for obtaining resources.

(f) To strike a balance between the necessary written statements to sustain the curriculum development model, and the encouragement of qualities less readily identified by such statements.

(g) To have an appreciation of the need for compromise between the achievement of the ideals suggested in the model and the amount of time which staff have available to execute them.

curriculum development team

The syndicate finally reported on two broader issues: choosing the curriculum development team and the role of the academic board. On choosing the team, it stressed that the main priority was to identify a co-ordinator who should be capable, where necessary, of ensuring co-operation across departmental boundaries. He should ensure that all staff who could usefully contribute were included from the beginning, giving thought to their compatibility, their need for professional development and should include, where possible, those who would ultimately be involved in the actual teaching. Adequate time allowance should be given for the work involved and if the group was not of readily manageable size it should be split into working units. The co-ordinator should think through the lines which the possible development might take in order to be better able to give initial guidance and inculcate enthusiasm.

The group noted that the academic board had responsibility for academic matters, in particular standards of entry, course content and assessment. It usually delegated this authority to the college departments after consideration of the resources available in each department. Whilst it might on occasions be the initiator of new courses, it had to approve all those proposed, including those modified, revised and rewritten. Where the academic board was responsible for the allocation of resources, after assessing the cost effectiveness of the models available, it had to decide a policy for financing curriculum development, i.e. on a college or departmental basis and the extent to which staff may be trained in appropriate skills in which they are deficient. It was for the Principal and the academic board to create a climate of opinion amongst all interested parties which would be receptive to the changes which curriculum development would produce.

Professor W H Dowdeswell, School of Education, University of Bath

Response

Responding to the syndicate reports, Professor Dowdeswell made a number of comments. First, he welcomed the healthy scepticism felt by some members regarding educational models. He stressed that the important thing to remember about a model was its limitations - and all models had them. Then Professor Dowdeswell spoke of some of the misconceptions about objectives. He emphasised that objectives were man-made - and intended to be useful. If they were not they should be discarded. Moreover, objectives were not simply to devise. They did not occur in a vacuum but depended upon the interaction between other aspects of curriculum design such as methods of presentation and modes of assessment.

Another issue Professor Dowdeswell raised was the question of who should initiate curriculum change. One of the main hindrances to curriculum development was heterogeneity in approach among the individuals concerned. To initiate such change it was necessary to gather together a team of people with like intent, though not necessarily like outlook. All had to believe that there was an urgent need for reform.

On the question of staff development, Professor Dowdeswell said that one factor which was frequently overlooked was that a curriculum project was not over when the completed scheme appeared in print. This was only the beginning. The most difficult aspect, namely, implementation, was still to come. Implementation involved the dissemination of information both inside and outside an institution, and communication often caused difficulties. This was a management problem.

With regard to evaluating materials, Professor Dowdeswell emphasised the importance of concurrent evaluation. If terminal evaluation only was

employed, unsuitable elements which had become incorporated might be difficult to adjust later on.

There was some discussion of the assumption that curriculum development could achieve a tight match between an agreed behavioural objective and a course designed to achieve it. Professor Dowdeswell wondered whether the assumption was sometimes made that a closer link could be achieved than was really possible. This might be because intuition plays an important part in teaching which curriculum development models tend to ignore. He also questioned the assumption that the achievement of objectives could always be measured; some were more readily measurable than others. For example, as a biologist he might wish his students to develop a respect for life, so that they did not wantonly destroy plants and animals, but such an attitude might be difficult to assess effectively. A member of the conference suggested that broad definitions such as this might be regarded as aims, and this would avoid confusion. Objectives could then be seen as stages in the achievement of long term aims.

Following the presentation and discussion of each syndicate report, Professor Dowdeswell commented on four main areas of concern in curriculum development.

small groups

First, he spoke of the important role of small groups in curriculum development. 'From such groups comes the initiation for curriculum development and the production of material in the early stages. This has implications for management regarding ways in which such activities can best be promoted. Such groups can act in two ways. One is the way already discussed, ie. the development of materials. The other is in a learning context involving new methods of presentation and assisting students. We have been concerned at Bath with the problems of providing materials for sixth formers and young people undergoing industrial training, involving decision making. Such activity takes place through group work and we find that the organisation of working groups and their relationship with the directing staff is important. For instance, in the development of decisions materials for children of between 13 and 16 years, particularly those in the CSE and RoSLA categories, the role of the teacher is important. For instance, how didactic should he be? We find that in the initial stage of group work some direction is essential; thereafter, groups can work increasingly under their own momentum. It is important to examine the relationship between the teacher and the learner in a group situation, where far too little research has been done at present.

staff development

The second theme recurring throughout the syndicate reports concerned staff development. What do we mean by staff development, and how do we see it operating? Usually, it is essentially parochial, taking place within an institution. But, what are we trying to develop? We could, for example, develop group activity or the improvement of certain skills or aspects of

management technique. All three could be important aspects of a curriculum. Such questions merit close consideration and opinions will vary greatly regarding their relevance to staff development. Limiting factors are finance and time. In some secondary schools one day each term is set aside for staff development activities.

curriculum design and the systems approach

A third issue which was raised repeatedly concerned the design of the curriculum and changing views towards it. For instance, how useful is the concept of behavioural objectives? The Open University's activities have had a considerable influence on curriculum design and presentation, its materials being based largely upon a systems approach. But even in the Open University there have been doubts about the universality of this rather rigid approach and we are now moving towards a situation where combined with a rigorous assessment in objective terms there are also looser, more intuitive and subjective forms of evaluation. Indeed, some aspects of the curriculum concerned with changing attitudes may not be evaluated at all or only in the long term. In relation to evaluation, much of what we learn manifests itself in two ways, in measurable achievement, and in changed attitudes. Both necessitate their respective modes of treatment.

heterogeneity of curricula

The fourth factor which was a feature of the syndicate reports was within a particular subject area, the immense heterogeneity of curricula existing in this country. Teachers often complain that they are hedged in by examination syllabuses. But a curriculum or syllabus is what the teacher makes it. There is a great difference between an examination syllabus and a teaching syllabus, and the teacher is responsible for translating one into the other. He ultimately, therefore, expresses his own personality and attitudes through the teaching syllabus which is evolved. But the time may come when through sheer lack of funds we will be unable to support the heterogeneity of curricula at present made available by the various Examination Boards. Curriculum development is a costly affair in terms of human time, materials and money. In other European countries such as France, Sweden and Germany curriculum development is more centralised and happens more slowly.
The principle of introducing change gradually thereby enabling innovations to be subjected to widespread evaluation in a wide variety of circumstances could be no bad thing. Too much variation can defeat its own purpose".

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BIBLIOGRAPHY

Baume A D & Jones B — Education by objectives. Curricular Study 1. How to use aims and objectives in course design, development and operation. Nelpress, 1974.

Billing D E — The pros and cons of modular courses. A look at the results of the CNAA's review of modular systems.
Times Higher Education Supplement. 8.11.74. No.160, p.8.

Coombe Lodge Reports — The Dip.H.E. Vol.7. No.11. 1974.
City and Guilds examinations - Present developments and future possibilities. Vol.6. No.8. 1973.

Davies I K — The management of learning. McGraw-Hill, 1971. In particular: Chapter 2. The teacher-manager & Chapter 3. Analysing the task.

Gardner J — Curriculum development in further education. The Technical Journal. December 1974. Vol.12, No.9, p.9.
A short review of the field with some guides for further study.

Greenaway H ed. — Staff development in higher education. Objectives for teaching methods courses. Occasional paper 1. Standing Conference of Educational Development Services in Polytechnics. September 1973. Copies obtainable from R. Fothergill, PETRAS, Newcastle-upon-Tyne Polytechnic.

Mager R F — Preparing instructional objectives. Fearon Publishers, 1962.

Owen J G — The management of curriculum development. Cambridge University Press, 1973.

Schools Council — Working Paper No.45. 16-19: Growth and response.
1. Curricular bases. Some suggestions for consideration from the Schools Council's second sixth form working party, with a discussion of the Certificate of Extended Education.
Evans/Methuen Educational, 1972.

Schools Council — Working Paper No.46. 16-19: Growth and response.
2. Examination structure.
Evans/Methuen Educational, 1973.

Technician Education Council — Policy statements. T.E.C., June 1974. and March 1975.

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TRENDS IN THE PROVISION OF COURSES IN TECHNOLOGY

A Comment on the Statistics of Student Numbers*

Introduction

Since 1951 the number of students in further education has expanded from about 1.9 million to nearly 3.4 million in 1972. This expansion has taken place in parallel with substantial growth in the number of young people remaining at school beyond the statutory leaving age, in the number of those undertaking teacher training and in the under-graduate populations. Further education has provided a flexibility in the British educational system based on a national educational philosophy of providing opportunities in response to student demand. Thus we have seen a change in the further education sector with origins founded on the provision of mainly vocational, mostly part-time courses to a situation where the sector displays a wide variety of courses which provide on the one hand alternatives to the school sixth form and on the other degree courses which supplement the provision of higher education in the still-expanding universities. This expansion at the extremeties has seen a growth in the number of full-time and sandwich courses around the central core of provision for part-time vocational courses, most of them provided on a day release basis.

Within this general pattern of change there have been slow but significant shifts in the emphasis on technology within the college. Before we examine statistics there are three points to be made. First, most of the figures we shall examine relate to England and Wales, there may be differences in Scotland and Northern Ireland although they may be no greater than regional differences within England and Wales. Second, the figures will relate to the number of students following courses which lead to recognised qualifications. There are approximately equal numbers following recognised and non-recognised courses. Most of the non-recognised courses are short courses or recreational and non-vocational courses. Finally, the figures relate to numbers of students without regard to the number of hours each week spent on the course. Thus they are not easily converted to full-time equivalents or to college work-load.

The figures we shall consider are derived from DES statistics in which students on advanced courses are classified in ten categories. Non-advanced course students are classified in the same ten categories to which is added an eleventh covering GCE and CSE courses. Advanced courses are those which require GCE 'A' level qualifications or equivalent for entry.

Non-Advanced Courses

The breakdown of non-advanced FE (in the DES categories) in 1973 was approximately:-

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*See Tables in Appendix I Page 345

Engineering & Technology	36%
GCE/CSE	36%
Social, administrative and business studies	10%
Professional and vocational subjects*	8%
Medical, health and welfare	2%
Agriculture	2%
Music, Drama, Art	2%
Science	2%
Others	2%

*Professional and vocational subjects include catering, home economics, retailing, nautical subjects and a wide variety of non-technological subjects.

To the extent that we might link some aspects of applied science with engineering and technology, their contribution to non-advanced FE is negligible since the total science contribution, much of which is related to mathematics, is only 2%.

The lower half of Table 1 shows the total number of students in non-advanced FE since 1965. The table shows a rise to 1969 thence a fall of almost 2% per year. The decline in engineering and technology, has been fairly steady since 1969 at a little over 4.5% per year. In the prediction of trends it is better to look at first-year students rather than total students. Table 2 shows that although there has been a decline in total student numbers the first year entrants rose between 1967 and 1972 at an average rate of about 1.9% per year, the first year entrants to engineering and technology fell very slightly (0.75% per annum). The change in school leaving age accounts for some of the 1973 reductions. Overall the engineering/technology share of non-advanced work fell from 42 to 36% between 1967 and 1973. In compensation the proportion of GCE/CSE entrants rose from 30 to 36%. Table 3 examines the distribution of entrants to non-advanced courses by type of course. We see that most of the students are on City and Guilds type courses but we should note the decline in OND/ONC figures. It should be remarked that the first year entries in 1972 to OND and ONC were 3,6000 and 10,600 respectively as compared to the corresponding figures of 2,500 and 19,000 in 1966.

Table 4 shows the breakdown of non-advanced course students by mode of attendance. The proportion of day-release students had remained fairly constant at about 83%, the decline in day release students in engineering remaining almost exactly in step with the total decline. On the other hand there has been some redistribution among other methods of attendance, a slight increase in full-time and sandwich attendance is shown but over recent years there has been a marked decline in the number of students attending evening courses. Since 1965 they have dropped from about 73,000 to 40,000 in 1971.

Table 5 shows an interesting fact, the ratio of first year students to the total number of engineering and technology students has shown a steady rise, clearly

on average students are spending less time in the college. Finally, Table 6 shows the relative subscription to the various subjects within the non-advanced area. For the main subjects the only significant shift is in the relative contribution to automobile engineering.

Advanced Courses

As compared with the 900,000 students on non-advanced courses, there are only about 200,000 on recognised advanced courses, ie courses which require minimum entry qualifications of one 'A' level or the equivalent. The upper half of Table 1 shows that the breakdown by subjects was:-

	1965	1973
Social, Administrative & Business Studies	22%	38%
Engineering and Technology	52%	27%
Science	9%	11%
Professional & Vocational Subjects	6%	7%
Medical, Health & Welfare	2%	5%
Music, Drama, Art & Design	5%	5%
Education	2%	3%
Language, Literature & Arts	2%	2%

Whereas science made a negligible contribution to non-advanced courses its contribution to advanced technologies courses is a little more significant. 11% of all advanced students follow courses in science and about 30% of these are in applied science. The ordering shows the growth of the business studies and the comparative decline of engineering and technology. Table A illustrates that in spite of a growth in entrants to advanced courses, a growth which has slowed recently, the absolute number of entrants to negineering and technology has declined substantially since 1968.

The types of course followed by the total of about 56,000 advanced students of engineering and technology are shown in Table B. About 47% are HND/HNC students, about 20% degree students and 30% are on professional and other courses. The HND/HNC share of the total has been declining steadily with a corresponding growth in the number of degree students.

Table C shows the distribution of modes of attendance, there has been a decline in total numbers of engineering and technology students by over 20% since 1966, the total numbers of such full-time students has remained about the same, there has been a modest increase in these sandwich students but a marked decline in part-time students. Part-time day students have fallen by 22% from 1967 and evening studies by nearly 67%. There has been a very marked decline in the number of people following the part-tume route in higher education. The reasons for this are no doubt:-

a) the decline in the currency of HNC as a result of the insistance of the engineering institutions on a graduate entry, although HND numbers have remained fairly constant.

b) the ease of access to full-time degree courses, many university and public sector degree places in engineering, technology and science remain unfilled.

c) Open University appeal to part-time students.

Table D compares the number of first-year students to the total, the ratio has not changed significantly from which we may deduce that since the intake is falling so is the time spent in college. This may be a reflection of either increasing wastage or the generation of shorter courses.

Table E examines the subjects of study and shows some changes. There has been a substantial and rapid decline in the appear of mechanical engineering but singificant growth in surveying, civil engineering and sutomobile engineering.

Table F provides an indication of the share of the non-university higher education which has been assumed by the 30 designated polytechnics. As far as engineering and technology are concerned only half the advanced course students are in the polytechnics although they have a rather higher share (58%) of other advanced courses.

We shall see, over the next few years, significant changes in the advanced course statistics as the 100,000 or so college of education students come within the sector covered by the further education regulations. The final table shows the numbers of people accorded day or block release by their employers. These in fact accord very closely with the figures shown earlier in the separate tables. They do not tally exactly because there are some part-time day students not recorded as released by employers and some who are released but do not follow recognised courses. The table shows that in spite of the recommendations of the Henniker-Heaton Report and in spite of the operation of the 1964 Industrial Training Act, the number of people released is declining. In 1972 about 25% of those released were over 21, 38% were between 19 and 21, and 37% below 18. The number of young people under 18 who were released in England and Wales declined steadily from over 275,000 in 1964 to less than 209,000 in 1972.

There is no better way in which to summarise what is happening than to look at the changes over the period 1968-1973. The changes which have taken place in the various sectors are shown in the table on the next page:-

CHANGE IN STUDENT NUMBERS 1968-1973

England and Wales (University GB)

Sector	Student Numbers 1973 Thousands	Change Since 1968 Percent
University (Undergraduate)		
Total	198.3 (GB)	+14.3
Engineering & Technology	30.0* (GB)	+ 0.9
Science	48.0*	+ 1.4
Advanced FE		
Total	208.4	+10.9
Engineering & Technology	56.4	-21.1
Science	22.6	+ 1.9
Non-Advanced FE		
Total	895.0	- 6.8
Engineering & Technology	384.3	-19.0
Science	14.4	-17.7

*Estimated

The summary shows a quite substantial decline in engineering and technology. In some colleges the formerly dominant position of engineering and technology has eroded. The reduction is almost entirely in terms of part-time students.

Apart from shifting the centre of influence within the colleges there is a general under-utilisation of staff and facilities. This under-utilisation is probably most widely reflected in a reduction of class size. Although changes over a five year period have been significant the year to year changes, masked by random fluctuations in recruitment, will often have passed without comment.

There are two lines of enquiry - first what is likely to happen to the national statistics, should we assume a continuing decline, would we be entitled to assume a levelling or can we see any signs of a reversal of the trend or postulate action to secure a reversal if such were considered desirable?

" Again many readers may say that their experience does not fit with the broad national picture. Where this is the case we ought to try to find reasons because that might give clues as to how to halt the decline (if indeed we believe it in the national interest to train more technicians and technologists). If on the other hand we can identify cases where the situation is substantially worse than the national average we need to enquire what has to be done, or what needs to be done with the staff and facilities which are under-used."

APPENDIX I

Tables of Statistics

Sources of Statistics

All reference to:-

Statistics of Education 1972. Vol. 3 - Further Education.
(and corresponding tables for earlier years)

Table 1	-	Extract from Table 18.
Table 2	-	Table 36 Direct Extract.
Table 3	-	Tables 31, 32, 33, 35 & 36 Extracts.
Table 4	-	Table 36. Man & Women added in each mode.
Table 5	-	Table 36 Direct Extract.
Table 6	-	Derived from Table 36.
Table A	-	Table 30 Direct Extract
Table B	-	Extracted from Tables 19, 20, 21, 22, 23, 24, 25, 27, 29, 30.
Table C	-	Table 30. Men & Women added in each mode.
Table D	-	Table 30 Direct Extract.
Table E	-	Derived from Table 30.
Table F	-	Extracted from Table 30 and Table 54.
Table G	-	Extracted from Table 40.

Note: Figures for 1973 are provisional.

Table 1

SUBJECT GROUPS OF STUDY

COURSES LEADING TO RECOGNISED QUALIFICATIONS AT GRANT-AIDED ESTABLISHMENTS(1)

ADVANCED & NON-ADVANCED COURSES

	MEN AND WOMEN								
	1965	1966	1967	1968	1969	1970	1971	1972	1973
ADVANCED COURSES									
Education	3,110	3,630	4,630	3,844	4,112	4,100	4,986	5,252	5,483
Medical, Health & Welfare	2,571	2,877	6,353	7,575	8,324	8,809	9,659	10,185	10,834
Engineering & Technology	78,471	71,956	72,571	71,544	67,882	62,609	60,246	58,435	56,385
Agriculture	101	130	489	985	1,154	1,185	1,403	1,082	1,035
Science	14,034	19,722	21,245	21,157	21,468	21,877	23,108	23,214	22,564
Social Admin. & Bus. Studies	33,442	43,681	52,262	58,326	68,019	71,012	73,174	74,969	80,033
Professional & Vocational	8,738	10,191	10,960	11,991	12,752	13,542	13,993	13,900	15,389
Language, Lit, & Area Studies	664	879	1,076	1,311	2,115	2,339	2,682	3,262	3,316
Other Arts	1,584	1,709	1,768	2,306	2,708	2,771	2,818	2,607	2,298
Music, Drama, Art & Design	6,994	7,619	9,528	8,967	8,972	9,008	9,202	10,575	10,984
Total Advanced Courses	149,715	162,384	180,882	188,006	197,526	197,272	201,271	203,481	208,321
NON-ADVANCED COURSES									
Education	207	507	598	2,863	3,381	3,816	3,876	4,669	5,088
Medical, Health & Welfare	16,236	17,786	14,890	16,025	15,638	16,188	17,007	19,221	21,813
Engineering & Technology	460,299	474,912	478,849	474,454	469,659	450,045	422,682	406,382	384,305
Agriculture	13,902	13,597	13,576	14,155	15,260	15,414	15,505	19,195	18,729
Science	15,957	16,219	17,630	17,458	18,190	18,559	16,076	14,457	14,370
Social Admin. & Bus. Studies	81,473	88,112	90,898	93,566	92,535	92,889	92,548	89,650	89,725
Professional & Vocational	66,927	67,589	72,408	75,957	77,288	72,566	71,677	77,741	69,581
Language, Lit, & Area Studies	9,404	7,560	9,806	10,499	10,176	9,129	9,470	10,034	8,184
Other Arts	10	6	5	10	6	9	10	69	22
Music, Drama, Art & Design	12,883	15,186	15,746	18,643	19,155	18,967	20,053	18,744	19,920
G.C.E. & C.S.E.	201,691	215,031	231,283	236,630	249,547	252,604	263,148	269,404	263,351
Total Non-Advanced Courses	878,989	916,505	945,689	960,260	970,835	950,186	932,052	929,566	895,088

(1) The figures in this Table cover all modes of attendance aggregated.

Table 2

FIRST YEAR STUDENTS ON NON-ADVANCED COURSES: ALL NON-ADVANCED COURSES

England and Wales

	Total 000s	Engineering & Technology 000s	% Total	G.C.E. & C.S.E. 000s	% Total
Nov.					
1966	546	227	42	165	30
1967	588	249	42	177	30
1968	611	253	41	186	30
1969	624	252	40	198	32
1970	630	252	40	207	33
1971	626	240	38	214	34
1972	644	240	37	224	35
1973	619	225	36	221	36

Figures for 1966-1972 extracted from Statistics of Education.

1973 Figures provisional.

Table 3

TYPES OF NON-ADVANCED COURSE FIRST YEAR STUDENTS OF ENGINEERING AND TECHNOLOGY

England and Wales

	Total 000s	OND & ONC	%	C. & G.*	%	Others	%
Nov.							
1966	227	21	9	193	85	12	5
1967	249	19	8	220	88	10	4
1968	253	17	7	226	89	10	4
1969	252	16	6	226	90	11	4
1970	252	15	6	221	90	10	4
1971	240	14	6	217	90	9	4
1972	240	14	6	217	90	9	4
1973	225	16	7	201	89	8	4

* Includes courses leading to examinations of Regional Examining Unions

Table 4

MODE OF ATTENDANCE

ALL NON-ADVANCED COURSES IN ENGINEERING AND TECHNOLOGY

	Total	Full-time		Sandwich		Part-time day		Evening only	
	000s	000s	%	000s	%	000s	%	000s	%
Nov.									
1966	475	19	4	2	0	386	81	67	14
1967	479	20	4	2	0	395	82	61	12
1968	474	22	5	3	1	396	84	54	11
1969	470	25	5	3	1	394	84	48	10
1970	450	24	5	3	1	378	84	45	10
1971	423	24	6	4	1	355	84	40	9
1972	406	25	6	4	1	338	83	39	10
1973	384	23	6	3	1	320	83	38	10

Table 5

PROPORTION OF FIRST YEAR STUDENTS

ALL NON-ADVANCED COURSES IN ENGINEERING AND TECHNOLOGY

	Total students 000s	First year 000s	% Total
Nov.			
1966	475	227	48
1967	479	249	52
1968	474	253	53
1969	470	252	54
1970	450	252	56
1971	423	240	57
1972	406	240	59
1973	384	225	59

Table 6

SUBJECTS OF STUDY

FIRST YEAR STUDENTS - ALL NON-ADVANCED COURSES

England & Wales

	1966 %	1971 %	1973 %
Mechanical Engineering	20.3	19.6	16.0
Building	18.5	15.8	19.2
'Other Engineering'	18.1	19.2	17.6
Electrical	16.7	18.3	20.2
Automobile	7.5	12.1	12.6
Printing	4.0	2.5	3.0
	85.1	87.5	88.4
Total Engineering & Technology	227,000	240,000	225,000
G.C.E/C.S.E.	165,000 (30%)	214,000 (34%)	221,000 (36%)
Total Non-Advanced Courses	545,000	626,000	619,000

* * * * *

Table A

FIRST YEAR STUDENTS ON ADVANCED COURSES

ALL ADVANCED COURSES IN ENGINEERING AND TECHNOLOGY

England & Wales

	Total 000s	Engineering & Technology	
		000s	% Total
Nov.			
1966	92	39	42
1967	102	38	37
1968	107	40	37
1969	110	37	34
1970	108	33	31
1971	110	32	29
1972	111	32	29
1973	116	30	26

Table B

TYPES OF ADVANCED COURSES

ALL STUDENTS OF ENGINEERING AND TECHNOLOGY

England & Wales

	Total 000s	DEGREES & RESEARCH		HND/HNC		OTHERS	
		000s	%	000s	%	000s	%
Nov.							
1966	72.0	6.3	8.8	44.3	61.5	21.3	29.6
1967	72.6	7.3	10.1	40.9	56.3	24.2	33.3
1968	71.5	8.3	11.6	36.9	51.6	26.4	36.9
1969	67.9	9.3	13.7	34.6	51.0	24.0	35.3
1970	62.6	9.8	15.7	32.4	51.8	20.5	32.7
1971	60.2	10.2	16.9	30.4	50.5	19.6	32.6
1972	58.4	11.0	18.8	28.7	49.1	18.7	32.0
1973	56.4	11.5	20.4	26.6	47.2	18.3	32.4

Table C

MODE OF ATTENDANCE

COURSES IN ENGINEERING AND TECHNOLOGY

ALL STUDENTS ON ADVANCED COURSES

	Total	MODE OF ATTENDANCE							
	000s	Full-Time		Sandwich		Part-time day		Evening Only	
		000	%	000	%	000	%	000	%
Nov.									
1966	72.0	6.0	8.3	12.2	16.9	35.7	49.6	18.1	25.1
1967	72.6	7.0	9.6	14.2	19.6	37.1	51.1	14.3	19.7
1968	71.5	7.2	10.1	15.7	22.0	35.9	50.2	12.8	17.9
1969	6719	6.4	9.4	16.7	24.6	35.1	51.7	9.7	14.3
1970	62.6	6.5	10.4	16.8	26.8	32.1	51.1	7.2	11.5
1971	60.2	6.7	11.1	16.5	27.4	30.0	49.9	7.0	11.6
1972	58.4	6.4	11.0	16.8	28.8	28.9	49.5	6.3	10.8
1973	56.4	6.4	11.3	16.1	28.5	27.9	49.5	5.9	10.5

Table D

PROPORTION OF FIRST YEAR STUDENTS

ADVANCED COURSES IN ENGINEERING AND TECHNOLOGY

	Total 000s	First Year	% Total
Nov.			
1966	72.0	39.2	54.4
1967	72.6	37.9	52.2
1968	71.5	40.0	55.0
1969	67.9	36.7	54.1
1970	62.6	33.4	53.4
1971	60.2	32.2	53.5
1972	58.4	31.5	53.9
1973	56.4	29.7	52.7

Table E

FIRST YEAR STUDENTS - ALL ADVANCED COURSES

ENGINEERING AND TECHNOLOGY

England & Wales

	1967 %	1971 %	1973 %
Electrical	28.2	20.5	19.5
Building	17.2	19.3	21.2
Mechanical Engineering	15.0	8.7	6.5
'Other Engineering'	14.5	18.9	17.1
Civil	6.6	9.3	9.9
Surveying	5.0	7.1	10.3
Metal Technology	3.2	2.2	1.8
Automobile	-	4.0	4.0
	89.7	90.0	90.3
Total (000s)	37.9	32.2	29.7

Table F

THE POLYTECHNIC SHARE OF ADVANCED COURSES

	All Subjects			Engineering & Technology		
	All Colleges	Polytechnics		All Colleges	Polytechnics	
	000s	000s	%	000s	000s	%
1971	201	111	55	60	29	48
1972	203	114	56	58	29	50
1973	208	117	56	56	28	50

Table G

DAY AND BLOCK RELEASE COURSES

Students released by Employers during Working Hours

	M	W	TOTAL
1965	518,482	83,546	602,028
1966			625,013
1967			639,963
1968			643,771
1969	550,435	94,837	654,272
1970			627,882
1971			587,505
1972	472,755	92,162	564,917
1973	452,929	90,137	543,066

Important Categories by Industry of Employer

Date	Public Admin. and Defence	Misc. Services	Mech. Eng.	Construction	Elec. Eng.	Prof. & Sci. Services	Transport and Communication	Vehicles
1969	63,645	60,924	77,114	67,615	43,057	44,102	29,991	31,994
1970	67,344	61,221	75,854	59,970	41,453	45,383	29,574	30,648
1971	68,289	60,475	66,846	53,260	38,475	46,075	29,116	27,437
1972	71,696	61,837	56,933	56,739	33,172	48,166	27,224	25,676
1973	71,870	57,287	52,314	62,911	32,306	50,339	25,727	21,427

. . . . .

Following his paper, Mr Latcham gave a rough guide to the implication of the decline in student numbers for staffing. The decline in student numbers was mainly on evening and part-time day courses, therefore figures had to be translated into full-time equivalents. Mr Latcham produced approximate figures for 1968 and 1973.

1968	Student Numbers		Full-Time Equivalents
full-time	22,000		22,000
sandwich	3,000		3,000
part-time day	396,000		99,000
evening only	54,000		-
		total	124,000

1973	Student Numbers		Full-Time Equivalents
full-time	23,000		23,000
sandwich	3,000		3,000
part-time day	320,000		80,000
evening only	38,000		-
		total	106,000

(In calculating full-time equivalents, full-time and sandwich courses have been counted as one, part-time day as 0.25. Evening only students have been ignored as they are often taught by part-time teachers)

Thus there has been a drop of about 18,000 full-time equivalent students. Allowing a generous class size of 15, giving an SSR of about 10:1, there ought to have been a reduction of about 1,800 staff, ie about three staff in each of 600 colleges. Mr Latcham suspected, however, that many of these staff were still there, and instead of teaching classes of 15 many were working with groups of eight or ten students. This was a problem which had to be faced up to and resolved.

J Latcham, Staff Tutor, Coombe Lodge. and A R Hammond, Statistician, DES.

Discussion Arising

Mr A R Hammond, Statistician at the DES, was invited to lead the discussion following Mr Latcham's paper, which he endorsed. Later in the session he gave a brief indication of the latest figures and likely developments.

student hours

The first question to be asked was whether a different picture would have emerged if the figures had been expressed in terms of student hours instead of student numbers? Neither Mr Latcham nor Mr Hammond thought so, although they agreed that the modes of attendance was an insensitive calculation, as there was nothing intermediate between a full-time classification and a part-time day description which only counted something like 0.25 FTE, although

the hours might not be vastly different in some cases. Mr Hammond said that the DES had given some thought over the last couple of years to whether they should tighten up the modes of attendance definitions or change to an hours spent basis for calculation, but had decided that the latter would cause too many difficulties at present.

day release

On the subject of the decline in day release, Mr Hammond explained that although the DES was concerned about this, there was not a great deal which could easily be done centrally to improve the situation. On the other hand, although the day release figures appeared to show a dramatic decline, when looked at as a proportion of these young people who are in employment or not in full-time education the drop was hardly noticeable. The reason was that a larger proportion of 16-19 year olds were in full-time education than hitherto. If allownace was made for ROSLA, there was probably an underlying recovery in day release attendance during 1973 and samples taken of 1974 figures also show a slight recovery. These early figures did not indicate whether the recovery was in engineering and technology in particular, or for that matter whether day release was being operated in industries which had not previously used it, rather than those in which it was already popular.

wastage

Mr Hammond was asked to account for the fact that although advanced courses were getting longer, the comparison of first year enrolments with total numbers had shown that students were in college for shorter periods. Mr Latcham explained that DES figures were based on college numbers on October 31 and at this point in the academic year include many later withdrawals. Mr Hammond added that students who repeated the first year instead of going on to the second year were also counted amongst the first year enrolments. The DES had not begun to collect information on the length of time students remained in college, which would give more accurate figures and eliminate confusion caused by first year repeats and direct entrants to the second year.

sandwich courses

What was the future for sandwich courses? Mr Latcham replied that as they were so costly to mount, they would probably only be used when circumstances absolutely demanded the industrial block. They would no longer be used for their novelty value, as had happened in the past.

Mr. Hammond then gave some indication of the latest developments, based on the sample figures which have been produced for 1974. But first, he described the two stages used by the DES in looking at subject patterns.

"First, the total numbers are examined in connection with the trends which affect them, eg. the size of the age group, the numbers staying on at school and so on. In the second stage numbers are divided into subject areas and trends which have been taking place in the past in these proportions are considered.

As far as the age group is concerned, the past few years have been favourable. Between 1966 and 1970 the number of 17-19 year olds decreased by several

percent a year but in 1970 this levelled off and 1974 figures show that the number of people at school leaving age is increasing, which accords with birth trends of about 18 years ago. An increase in the size of the age group should, other things equal, increase the demand for FE. A factor which seems to tell against this is that the rate of increase in numbers staying on at school beyond the statutory leaving age and the numbers interested in full time education appears to have slackened off. This has wiped out the effect which the increase in the number of 17 and 18 year olds might have had.

In terms of the subject area, proportions entering science and technology have been decreasing since about 1966. The DES now thinks that the corresponding move away from science in schools could be slackening but one could be over-optimistic about this since the numbers taking science subjects in the first year of the sixth forms show no very marked sign of recovery.

Thus the slackening-off in the number of people going into full time education after school and the fact that the proportion of these with a science bias has also declined have resulted in the marked drop in proportions doing engineering and science in FE. At the same time, it must be acknowledged that the 1973 FE figures were particularly low, ROSLA being a major cause. Hence, where the rise in any area of FE flattened off in 1973 there appeared to be a slight increase in 1974. Where there was an accelerated decline in 1973, it tended to be arrested in 1974.

On the whole, it seems likely that over the next few years the drift away from science and technology will continue although perhaps at a diminishing rate. If numbers do increase it will most probably be due to a recovery in numbers going into FE as a whole since this is more volatile than subject patterns. An exception might be in subjects connected with the oil boom, but even here there may not be a dramatic effect, given the chastening experience of the aero-space "boom" and the computer "boom" where huge demands for courses were forecast by many people but did not materialise. Overall, the numbers going into full time and part time education after school leaving age is also unlikely to increase as rapidly as it did a few years ago, although day release may be on the turn.

Taking a longer view, the numbers in the age group will flatten off in 1980 and will begin to decline in 1982-83. This means that the declining proportion of people going into science and technology will no longer be protected by the rising population. However, it is difficult to forecast student preferences. One can only hope that the requirements of the economy have an effect in the long term upon the aspirations of people leaving school and going into FE, by their perception of the opportunities open to them."

G Birkby,
Head of
Department of
Engineering,
Dewsbury and
Batley
College of
Art and Technology

THE YORKSHIRE IDEA

"The Mechanical Trade Principles course run by the Yorkshire Council for Further Education is a course of further education designed for persons who are either preparing for, or following, any of a wide range of mechanical based trades or occupations. It is intended to provide instruction in the principles embodied in these trades, an understanding of which is essential if good workmanship, job satisfaction, and adaptability to change are to be obtained.

The curriculum is framed so as to enable workers at various levels of ability and degrees of specialism to benefit from the course. It allows a useful qualification to be obtained if the length of attendance is one year or more, the value of both the qualification and experience increasing as the length of attendance is increased. The length of attendance can therefore be chosen to suit the type of job and the limits of ability of the worker, and those who have initially achieved a minor qualification can improve it by further attendance. The course can be arranged locally in order to accommodate students of differing levels of ability and it is intended that the curriculum should be presented and managed in co-operation with industry to meet the needs of specific groups of students, rather than that students should be selected to fit a fixed course form and content.

The course structure takes account of the shift that has occurred in the distribution and use of industrial skills, especially the fact that many skilled workers do not receive or require training so substantial as to amount to a full apprenticeship. It recognises that many of those who receive shorter training, or employ a more limited range of skills have need of further education but cannot be supported, or are unable to sustain courses previously offered. The course can therefore be presented to suit those who would have taken the Mechanical Engineering Craft Practice (Part I) course, or those who required a craft type course but do not receive the full complementary training for the Basic Engineering Craft Studies series, or those who may be highly skilled in a limited range (eg. skilled operators) rather than multi-skilled craft workers, and for whom FE is feasible if the course is of a type and duration compatible with the occupation.

The course should be conducted in a practical manner since most students will accept practical and graphic learning processes and are likely to reject abstract

and academic methods. The syllabus structure allows instruction to be aligned with the particular industrial conditions in which the student works without leading to undue specialisation in the college and consequent fractionation into uneconomic class units. It also provides for close co-operation between college and firm to make the course meaningful to the student and significant to the employer.

Course Structure and Duration

Engineering (and many other) technical courses have hitherto been structured on a fixed duration and fixed level basis, i.e. a course might be two years to intermediate and a further two years to final level.

Its content would assume that all entrants would acquire a minimum range of multiple skills and all the associated information. Its level would assume that all entrants should be capable of four years attendance and of ability to meet terminal conditions successfully. Such courses are by definition unsuitable for anyone who cannot meet the fixed conditions, thus producing a 'failure' concept, and a bar to those in 'non-matching' industrial conditions.

This course adopts the alternative principle of being adaptable, within reasonable limits, to the needs of particular groups of students. It permits adaptability in two ways. Firstly, it allows a length of attendance appropriate to the needs of the student, but provides a substantical achievement and qualification for those who complete it fully, so embodying considerable incentive to proceed. Those who have more limited attendance nevertheless qualify at the level they have completed. Secondly, the syllabuses are arranged in units of basic information supported by project work, linked to job conditions and the depth of treatment can be varied according to the prospects of the group being instructed.

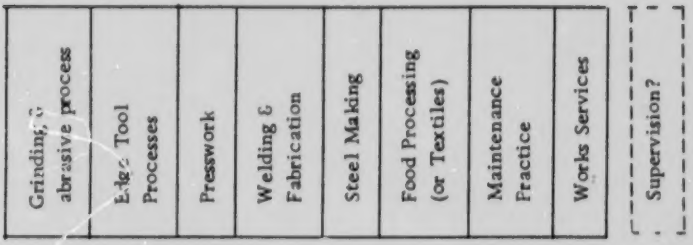
The general structure of the course is shown in Figure 1. The age scale has no significance except to show that the course can align with normal youth development. The course would be acceptable for those in training or re-training at any age.

FIGURE 1 COURSE STRUCTURE

Age*

21

20 Supplementary Subjects Specialisation



Third Year Secondary Division

18

Machining Production	Non-Machining Production	Process Industry	Maintenance

Second Year Primary Division

17

Production	Services

16

First Year Basic Course

15

Pre-F.E. Expectations

*Students may in fact take the course at any age

The process of learning up to the end of any year would be complete in itself. Thus the 1st year alone would be a useful course in simple basic information (usefully interpreted through project work) and would qualify for an award. 1st and 2nd years will provide for another award. Completion of 1st, 2nd and 3rd years would be a major achievement, and supplementary work would meet specialisms in significant skills.

As students proceed through the course, it is suggested that they need only divide into broad industrial categories up to 3rd year so that the need for separate groups is kept to a minimum whilst providing for industrial categories, eg. in process industries that were not provided for at all in previous courses. (It is known, for instance, that a considerable number of maintenance workers in non-engineering industries require, but do not get FE because existing fixed pattern courses are based on an engineering industry group of skills and topics.) These broad divisions allow topics of general relevance to be included in the syllabus (eg. lifting equipment, or factory services in Maintenance) whilst still leaving the more direct link with the occupation to be obtained through project work.

This principle of generalised syllabuses, linked to the occupation through project work and operational outlines appropriate to the firm also provides the link between job training specifics and the generalised experience of further education. In this structure the FE course stands as a valid structure in its own right, providing basic information which can be applied to a wide range of industrial conditions, but capable of being related to particular job conditions by proper management of the syllabus and co-operation with the firm.

This is an acceptable alternative to the craft practice type of course which dealt with the demonstration of particular skills and with the testing of skills abilities and was identified with skills training, and which could not much longer survive in the present industrial atmosphere.

In the syllabuses proposed it can be clearly seen that practical work, (even though closely linked to a firm's processes) is the exemplification of a particular basic concept and the linking of a number of items of information to get understanding, not the perfection of any particular skill. There are also elements of planning, personal initiative and team working involved. These are factors of personal development of much wider consequence than can be contained in most skill training processes and which further distinguish the course as an educational process.

The subject syllabuses do not define a group of skills forming the content of the course. Each one describes a quantity of basic information likely to be needed in whole or in part whatever the combination of skills involved in the student's occupation. At 1st year level the elements of information are so basic as to be applicable to all students, provided that they are suitably interpreted by project work so as to make sense to the student in his occupation.

This means that there must be a different approach to course management than was the case in courses such as the Mechanical Engineering Craft Practice (Part 1) course which assumed that all students would reach a fixed level, covering an identical range of skills in practical work which was skill-producing and often not related to occupation at all. The basic information units for lst year are as follows:

1. Measurement.
2. Properties and applications of materials.
3. Forming of materials.
4. Joining of materials.
5. Production of flat surfaces.
6. Production of cylindrical surfaces.
7. Production of holes.
8. Joining of parts.
9. Services.
10. Preservation and protection.
11. Lubrication.
12. Instructions and symbols.
13 Metal cutting tools.

The syllabuses are intended to be treated by a particular educational technique, and Notes for Guidance on the management and teaching of the curriculum will help teachers to establish the characteristic treatment intended for the course and avoid the continuance of certain practices which have exacerbated the confusion between education and training. A particular syllabus section is headed by a basic concept requiring a short lecture to delineate that area of study and its purpose. The relevant technical information and supporting studies are given to the group by various group instructional processes. Operational outlines are particular tasks performed by the individual to consolidate group instruction or to impart information of understanding best done in that way Group projects bring out the relevance of the topic, relate it to the occupation, and round up the instruction in practical terms. They may or may not involve manufacturing and may use skills or reveal them but are not the means of producing them.

A specimen subject syllabus is given in Appendix I and the subject curriculum for the three years of the course is given in Appendix II, and brief notes on methodology in Appendix III.

APPENDIX I

13. METAL CUTTING TOOLS

BASIC CONCEPT	SUPPORTING STUDIES	GROUP INSTRUCTIONAL PRACTICE	OPERATIONAL OUTLINES	GROUP PROJECTS
What happens at a cutting edge - simple introduction to chip formation.	Elementary treatment of forces acting externally at a tool point. Friction in cutting. Heat and its effects. Identification of materials commonly used for cutting tools. Meaning and importance of cutting speed and tool angles. Safety hazards associated with chip formations.	Shape and angles of standard straight edged tool for turning and shaping. Tools for parting and facing. The hand chisel and file, cutting angles and action. The metal saw cutting angles and method of use. The standard twist drill cutting angles and main features. Spot facing and counter-sinking tools. Taps and Discs considered as cutting tools, metal removal and clearance.	Examination of new and worn tools. Measuring of angles. Observation of chips and chip formation. Examination of catalogues and data sheets for tools, including identification of types, sizes and grades of tool. Demonstration of re-furbishing processes. Production and examination of typical threaded holes and parts, use of lubricants.	Re-furbishing of tools. Simple observations of tool behaviour. Examination and control of tool stocks and supplies

YORKSHIRE COUNCIL FOR FURTHER EDUCATION MECHANICAL TRADES PRINCIPLES APPENDIX II

1st Year

1. Measurement
2. Properties and applications of materials
3. Forming of materials
4. Joining of materials
5. Production of flat surfaces
6. Production of cylindrical surfaces
7. Production of holes
8. Joining of parts
9. Services
10. Preservation and protection
11. Lubrication
12. Instructions and symbols
13. Metal cutting tools

2nd Year

Production

1.* Measurement
2.* Properties and application of materials
3.* Forming of materials
4. Joining of materials
5. Joining of parts
6. Production of surfaces and holes
7.* Preservation and protection
8.* Instructions and symbols
9.* Metal cutting tools

65

Services

1.* Measurement
2.* Properties and application of materials
3.* Forming of materials
4. Joining of materials and parts
5. Machining processes
6. Industrial services and instruments
7.* Preservation and protection
8.* Instruction and symbols
9.* Metal cutting tools

*Common.

66

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APPENDIX II

(Continued)

3rd Year			
Machining Production	Non-Machining Production	Process Industry	Maintenance
1. Measurement A	1. Measurement B	1. Measurement and testing	1. Measurement and testing
2. Properties and application of materials	2. Properties and application of materials	2. Properties and application of materials	2. Properties and application of materials
3. Metal cutting (tools, materials, behaviour, lubrication)	3. Forming of materials	3. Supply and fixing of materials	3. Supply and fixing of materials
4. Joining of parts (machining)	4. Joining of materials	4. Joining of materials and parts	4. Joining of materials and parts
5. Machining by edge tools	5. Presswork processes	5. Installation of plant and equipment	5. Installation of plant and equipment
6. Machining by abrasives	6. Fabrication processes	6. Industrial services and instruments	6. Machining processes
7. Product handling and protection	7. Preservation and protection	7. Planned preventative maintenance	7. Industrial services and instruments
8. Services A	8. Services B	8. Specialist option	8. Planned preventative maintenance
9. Instructions and Symbols A	9. Instruction and symbols B	9. Pollution control and hygiene	9. Fault diagnosis and correction
10. Production planning	10. Production planning		

APPENDIX III

YORKSHIRE COUNCIL FOR FURTHER EDUCATION

MECHANICAL TRADE PRINCIPLES

METHODOLOGY NOTES

1. It must be borne in mind that many teachers are accustomed by long experience in orthodox craft courses to dealing at length and in detail with craft skills and practices. In many occupations for which the course will cater this approach will not suit either the student or the employer. The employer will wish to deal on the job with the specific skills required. What he will want is ability to understand what is required, a grasp of the basic elements of skill on which he can quickly build. He also expects to find that the student has been informed about technical concepts and processes so that he understands his working environment and treats his work responsibly. The student wants to feel that what is being learned is useful in the short term and helpful to his prospects in the long term. He also needs to know that his employer considers the course useful.

   The course therefore is not intended to have its topics treated in great detail or with the amount of repetition necessary to induce the development of skills. It does, however, aim to show clearly how skills can be acquired and how they can be usefully employed and in such a way as to develop self-learning abilities in the student.

2. Basic concepts

   Clear introductory lecturettes heading distinct sections of work to explain what the scope of the section is, what is to be covered, why it is necessary and important and how the work will be tackled so that the student knows what is before him.

3. Supporting Studies

   Scientific, calculatory, ancillary and background facts necessary to an understanding of the technical information and working processes being presented. Objectives are to encourage ability to reason out difficulties, to look for basic explanations for behaviour, and to better understand information.

4. Group Instructional Practice

   The use of demonstration and modern presentation techniques (including pro formae) to convey technical information with the minimum of orthodox note-taking and lecturing. To encourage discussion, acquisition of information from standard sources and

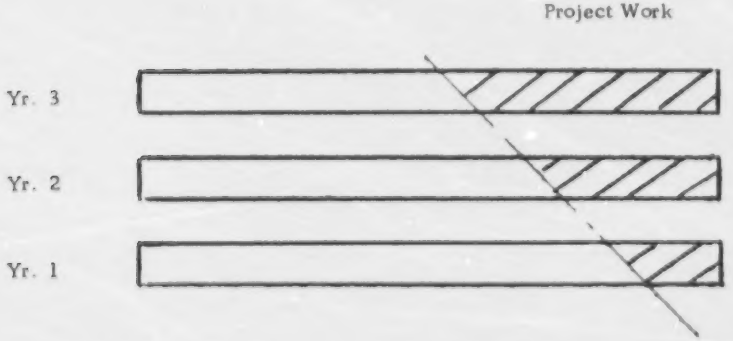
self-learning techniques. The syllabuses are drafted with the intention that they would be difficult to satisfy by using only conventional lecture room techniques.

5. Operational outlines

Relatively simple operations which can be carried out by the student without personal guidance (perhaps on the basis of pro forma) to enable him to be convinced that he can personally accomplish essential practices. These would be practices linked to the basic concept and to important elements of technical information. The approach might involve some reasoning or might involve providing elements of absent information. The outlines would need to be carefully planned and programmed. They would not amount to repeated practice which would develop particular skills.

6. Group Projects

These would be carefully chosen jobs embodying a number of basic concepts and operation outlines, preferably done by at least two students and organised with regard to, or in co-operation with, the firm or industry. The project would require some planning and arrangement and should endeavour to present learning situations, ie. situations in which the students would learn from each other and from their contacts (i.e. the company) in carrying the project through. The project would provide the main opportunity for linking the course with the specific needs of the firm or the industry. It would be the medium through which the basic concepts and operations would be translated into the needs and interests of specialised jobs and through which the support of industrialists would be obtained. The amount of time allocated to this topic and the sophistication of the project could be escalated through the years of the course.



" It will be extremely important to think about project work in the context of this course. Much existing experience of project work is in connection with technician courses and involves a complexity and depth of knowledge well beyond the aims of this course. Projects in the course will not be intended to prove multiple skills or grasp of complex design factors. They will be successful if they enable students to discover and understand technical facts unaided; to read and understand essential tables and documents; to combine together and show the direct application of the elements of a part of the course; to examine and understand some process or important part of his employer's equipment. Above all to develop the capacity and confidence for self-learning."

* ** *** ****

Elaborating on his paper, Mr. Birkby spoke of assessment, student numbers and the type of students who attended the course in Yorkshire.

On assessment, Mr. Birkby said that this was an on-going process, so that there was no massive burden of work and at the end of the year lecturers would not need time off teaching and other departmental work to cope with it. Assessment was therefore in three forms: continuous assessment based on course work; a short oral test; and a short final examination. Assessment was to a standard known by everyone - employers, students and lecturers. The student profile system was used and this enabled each student's progress to be carefully monitored. Employers were involved with all aspects of the practical learning process. An industrialist was appointed to carry out an oral assessment of the students practical project work. The assessor discussed with the student a project of his choice and this talk took place in a quiet corner of a room where the other students were working. The student also prepared a short written report. This oral test showed whether the student was able to express himself clearly, give a short report, understand his project and the various practical elements which go to make up the practical process of making it. It also gave the student the opportunity to talk to an industrialist about his own work, both in the College and in his employment.

The written test taken at the end of the year was not longer than one and a half hours duration and was taken in the form of objective type questions and short written answers of three or four sentences. This test gave student a target at which to aim. It was felt that some student would feel cheated or let down unless they had a formal examination.

All students received a certificate provided that they had attended 75% of the course and had completed the assessment. On the reverse of the certificate there was a description of the student's main project and a list of other projects and topics covered. The certificate was endorsed by the industrial assessor as well as the College Principal, which gave it added credibility.

Mr. Birkby then described the development of the course in terms of student numbers and Colleges involved, as shown below:-

1973/74:	45 students entered lst year at 3 colleges	
1974/75:	130 students entered lst year at 6 colleges	
1975/76:	(estimated) -	300 students enter lst year at 12 colleges
		100 students enter 2nd year at 6 colleges
		30 students enter 3rd year at 2 colleges

None of these students are losses to the Craft Studies courses and at least 50% would not previously have got day release. An analysis of first year students in 1974/75 shows that there are 62 enrolments from occupations not previously recruited on to courses (16 textile, 14 semi-skilled and 32 others) about 20% of the students are doing maintenance work. Some are apprentices in small firms which do not come under the ITBs. They range in ability from people who have poor communication skills to those with a few CSEs or 'O' levels.

Discussion Arising

In view of the fact that some of the students have low literacy and numeracy abilities, was there any provision for general education in the course? Mr. Birkby explained that the general studies period was used as a remedial session to improve the students' literacy and numeracy and the colleges' general studies departments said that there was an improvement in these abilities during the course.

It was suggested that a broader spectrum of students, including those from the process industries, might be allowed to attend the course by their employers if the title did not stress 'mechanical' trade principles. Mr. Birkby took the point, and said that colleges would have to explain to employers that the course was not exclusively aimed at those in mechanical engineering industries.

Did Mr. Birkby see the course developing into a full-time one, lasting between three months and a year? He said that the course was being proposed for national use in Borstal institutions, and a number of examining bodies had shown an interest in it. Therefore other courses might develop on a national scale, eg. for process trade principles or welding trade principles, and they might use a full-time mode of study as well as the part-time day pilot courses now being run.

W B Foster,
Principal, The
College of Further
Education,
Plymouth.

COLLEGE DEVELOPMENT AND SOME OF THE PROBLEMS OF IMPLEMENTATION

"When the invitation to present this paper was first given in November 1974 it was accepted that (primarily) the intention was to deal mainly with the impact of TEC proposals on College life and approaches. Since then however, the economic situation within the country, the financial stringencies imposed upon Local Education Authorities, the Chancellor's Budget and the worsening employment position have all conspired to change the face of Further Education.

It may well be, that for a few years the restrictions now being placed upon Education in general and Further Education in particular will moderate the rate at which changes were expected and so throw the whole timetable out of alignment.

Because of the situation in the country, students may well change not only in number but also in type. Appointment of new staff may well be restricted and existing staff may not be permitted to be replaced. It is probably valuable to look at some of the national changes which affect the climate within the Colleges and then to consider how College plans will be influenced by proposals such as those outlined by TEC remembering always that some of the implementation may be delayed beyond the 5 year period suggested.

National Changes

economic pressures

Economics, almost certainly, will govern much of our thinking over the next few years. National economic pressures have already been felt in a variety of ways, of which TEC is itself an example. Some of the Council plans, ideally intended to be dealt with in a parallel manner, are now of necessity being considered in tandem with priorities needing to be determined. Problems are thereby created, but are not as yet of serious magnitude. BEC is also affected by these pressures and reports such as "Hudson" and "Gann" are being reviewed as much (if not more) from their economic viewpoint as from their educational.

From the College standpoint, national economics affects building programmes both Capital and Minor Capital. It affests the provision and replacement of capital equipment and all these together can affect course approvals.

It is, however, at the LEA level that the real cold wind of economics is being felt. Following the recent large rate increases, Policy Committees have been looking for measures which would make significant impacts upon rate levels. It is only really in the area of manpower planning that this is possible. Initially in Colleges, this is bound to affect non-teaching staff first - domestic, administrative, technical, but then inevitably teaching staff are concerned beyond that point.

Most Authorities have accepted that the very best they may do is to hold services at the 1973/74 level but that the norm is likely to be a reduction in service with poorer facilities, fewer staff, fewer students and fewer courses. Student/Staff ratio will become progressively more important and some of the ratios being quoted at the moment within LEA's are disturbing if not frightening.

At a time when the new "Conditions of Service" are anticipated to come into action, the smooth guidance of a College against all these factors becomes very often a matter of hope rather than actuality.

TOPS

The Manpower Services Commission, and its twin arms the TSA and the ESA have had a significant impact upon Colleges. TSA, by encouraging and developing TOPS courses, have inserted a great factor into the economic equation. TOPS courses are usually cost-effective, if not outright profitable, and so are beloved of County and Borough Treasurers alike. Staff, who in future may otherwise be under employed, can be fully utilised. Expensive capital equipment and accommodation can both be occupied and so overall expensive resources both human and material can be fully utilised. Such courses, however, are not primarily educational but rather training so the approach of the College may need to change. The TOPS pattern is expanding and after the Chancellor's recent Budget it is clear that it will expand much more and could tie up a good deal of resources.

TEC and BEC

TEC and BEC have both been set up to rationalise and unify Technician and Business Education throughout the United Kingdom (with the exception of Scotland). As quickly as may be, they are expected to become financially self-supporting so that precept from Government sources may cease. Economically therefore they are required to act quickly, but current economics is imposing a rather slower rate than the Councils originally anticipated.

In addition, the emergence of reports such as "Hudson" and "Gann" with their direct impact upon committees such as C3 and C6 and their lesser impact upon others, affects the speed of working of these groups.

In turn, the speed with which Colleges can prepare submissions depends upon the ability to utilise staff in developing programmes and the speed of production of guidelines from the Programme Committees.

These are some of the factors affecting the climate within which Colleges will be developing and adapting over the next few years. If the situation - in particular the economic situation - worsens as time goes on, then change and development will be delayed. If it does not, then the whole schedule could come forward. It was with this in mind that TEC produced its proposed timetable and as was said in its "introduction" such a timetable is not to be regarded as being rigid and inflexible. The climate and resources available now - and in the foreseeable future - may affect the speed of College development and ability to adopt a posture from which the new demands can be met. By investigating what the demands are likely to be changes can be instituted even now which will enable Colleges to respond as soon as may be to the new approaches.

Thus, whilst there is by no means any certainty about the time scale, nevertheless changes will occur and, of those occuring, TEC and BEC are likely to be major forces in bringing such changes about. What policies BEC will adopt as yet no-one knows and their first major document is currently awaited with interest - not least by TEC. There are many areas where the two Councils will overlap and will need to cooperate - data processing, work study, economics, supervisory studies etc. - and it is to be hoped that the two patterns will mesh easily with each other.

From the policy document issues by TEC in June 1974 and in the information released since, it is clear that a number of fundamental changes are envisaged from the pattern currently followed by Technicians.

1. The Unit/Credit system lays greater stress upon the final level of achievement reached by the student rather than upon the number of hours of study involved or the academic level at entry. Some students may well require more hours work on certain parts of the course than others.

2. The Colleges will be given the chance of - and strongly encouraged to accept - increased responsibility and authority for their own students, their selection, their entry, their programmes and their standards. Guidelines of course will be issued nationally.

3. The programmes will have national interchangeability in the "essential" areas with reasonable flexibility to reflect local or regional needs and interests if desired. National standards will be set within the "essential" areas and the other "optional" or "supplementary" areas judged against these.

4. Job specifications of Technicians are of prime importance so the close involvement of industry and other employers is imperative at all stages, planning, teaching and assessment, not only nationally but locally as well.

College Developments

Colleges working singly or in groups, will need from the very earliest days to be fully involved in a number of stages.

a) Programme Analysis

To establish the needs of the local students/industry against the guidelines issued by the Programme Committees to create a coherent and viable programme within the capabilities of the students and resources of the institution. The programme should satisfy the needs for national standards, the aspirations of the students and the reasonable requirements (if any) of local/regional employers.

b) Programme Devising

This is a continuation of (a) and would involve the preparation of a full programme structure with due regard to the balance of essential, optional and supplementary units (including standard and College devised). These units will not only be cross-disciplinary in character but may well need to fit with other programmes for other Technicians where common units are involved and/or include units (maybe as supplementaries) enabling entry conditions to Higher Education courses to be met.

c) Unit Preparation

TEC will strongly encourage a movement towards the presentation of units for validation written in the form of learning objectives. Unit preparation of this nature requires a good deal of time and effort but is of great advantage in the ultimate teaching process, in the blending of units and in moderation. This is likely to be a key point in College developmental work and can begin now.

d) Assessment and Moderation

Internal assessment, by the staff involved, of the standards achieved is integral within the TEC programmes and both teaching staff and their industrial colleagues will be involved. External moderation of key (usually final for that standard) units will take place and staff will no doubt be involved as moderators. Assessment techniques will be those most appropriate to the units concerned and should reflect the employment requirements of the Technician. For instance, a medical laboratory technician may sometimes have to work at speed under stress, and the assessment should test this ability.

staff development

In most of the above, but particularly in (c) and (d) staff development will need to occur, often to a marked degree. Some Colleges, RAC's, Technical Teacher Training Colleges and Coombe Lodge are already involved in this exercise in particular in respect of unit writing in the form of learning objectives. There is plenty of time for this to take place as many programmes are not scheduled to begin for a few years.

When (a) and (b) above are considered paragraph 5.1.4 of the Policy Statement is significant. TEC will look for close consultation with local industrial and other specific interests. Often this will be best done through a local/area Committee structure but more closely involved than the usual "Advisory" Committees.

attitudes

In order to achieve these ends, considerable developmental work may need to occur within Colleges, not least in the area of staff attitudes towards the opportunities made available as a result of the TEC approach. Most staff will welcome the chances but, at least in the early stages, some apprehension may well be felt until parameters of responsibility are firmly established. At the same time industrial colleagues may well need additional and special consideration until they can play a full and active part in programme development and assessment.

departmental barriers

Within a College there may well be problems of breaking down residual barriers between Departments so that the programme is viewed fully from the needs of the Technician. All involved in the programme should contribute on an equal footing, not as "owners" and "service" but as equal partners in creating a coherent whole.

This inter-Departmental linking, the liaison with local industry and other interested areas and the development of the ideas and skills inherent in the TEC approach will need time, effort and understanding. Against a background of economic uncertainty and of "Conditions of Service" fears this will not be easy but over-pessimism is just as futile as over-optimism. Much can be, and is being done, probably not as fast or as extensively as would be liked, but it is happening.

External to the single College other factors, often similar in character to the above, emerge and must be met often by a changing attitude within the Colleges.

Joint Programmes

Most obvious is the situation in respect of Joint Programme working. The simplest case here is where a limited number of Colleges offer a single programme on a national basis eg Marine Radio Officers. In this type of case, joint discussions between the appropriate Colleges and the employing firms may cause a single programme to emerge, to be submitted separately to TEC for validation. In these cases there should be relatively few problems except possibly where outside bodies eg Department of Trade, have a significant influence.

Less easy, in some respects, is the case where a Joint Programme is to be produced between closely adjacent Colleges - often within the curtilage of the same LEA. Commonality of some - often the major - parts of the programme will probably occur with local variations being reflected in optional or supplementary units. Close inter-College working, inter-College assessment and self-moderation will be necessary and traditional differences and rivalries will need to be eliminated. Within a single LEA the natural desire of an Authority to conserve resources will be a significant factor. Utilisation of each other's equipment, staff and expertise may well need to develop beyond the "lip service" so often paid at the moment.

On the other hand, it is intended to validate a College and not necessarily a group of Colleges so there is no intention of TEC moving towards the situation of locating certain programmes in "favoured" Colleges and not in others. The criteria will be the ability to provide the programme submitted with adequate resources. In this matter of location, the LEA will clearly hold a major role with the RSI being involved in the case of "advanced" units. Again, with joint working, industry and other employers will need to be fully involved.

method

Overall, whether programmes are intended to be individual College or group programmes, TEC is not being involved at this stage in making any statement upon teaching method. This is still - and must be - left to the discretion of the individual teacher or group of teachers. Attendance type is to be left to the appropriate College or group of Colleges. Some units may be dealt with as (say) 2 hours/week for 36 weeks, or as a block of (say) 70 hours, or any other conformation. The units may be dealt with separately or together as the needs and convenience of the timetable demands. A slavish conformance

to hours is not to be required and the units can involve traditional class/workshop/laboratory contact and/or guided study or project work or private study etc. in order to reach the final standard which is the controlling factor.

SSRs

Often educationalists tend to look for the unusual and concern themselves with how the non-homogenous is dealt with. By and large most students will fall into a similar mould so timetabling may well be different, but generally no more difficult than at present. What will be difficult is keying in - if possible - other Technician programmes to create viable class numbers - or SSR's. The flexibility of the TEC system does allow for the unusual to be dealt with or for credit to be given where little was available before. What TEC does not intend to do is to imply the development of, or to create, a "cafeteria" approach where units are assembled much as packets from a shelf.

Undoubtedly, the introduction of TEC principles into Colleges will cause changes in attitudes, in methods and in structure. The changes are intended to give staff opportunities to develop ideas, methods and professional approaches so as to produce a Technician force within the country able to meet its current and foreseeable needs and adaptable to change.

Such new patterns cannot be created overnight and time will clearly be needed. Within any College, however, a start can be made - if only in a small way - at the present time with the full knowledge of great advantage accruing in the future."

Discussion Arising

TEC was the subject of the discussion which followed Mr Foster's paper. First, the possibily high cost in terms of manpower if colleges responded to regional needs in TEC courses and developed regional bureaucracies was raised. Would it not be preferable to have a more centralised planning and course development system for TEC?

Mr Foster pointed out that standard units would be available, and so would standard programmes, although colleges were not going to be forced to use them. The most likely pattern would be for courses to be composed partly of standard units - probably 10-12 of these - and partly of college-devised units. While the pilot exercise which had been carried out into the devising of TEC units had been very costly in terms of manhours, the devising of units would become a much more rapid exercise as people became more practised at it. Moreover, as the present 98 examination committees would be replaced by 22, there was likely to be some financial saving in this rationalisation.

The comment was made that in the past, advisory committees made up of industrialists had often been valueless. What indication was there that industrialists involved with TEC would make a more useful contribution to course development? Mr Foster replied that he had been surprised at the amount of help industrialists had given on the Council itself, and its Sector and Programme

Committees. He felt that industrialists had realised that would be to their economic advantage, should the financial situation improve, to make use of manpower trained on TEC courses.

If TEC courses were to be based on the job specifications of technicians, and as their jobs varied to much, would some common element be found in order to get viable numbers on courses? Mr Foster explained that national Programme Committees would investigate the needs of technicians in different areas and would therefore be aware of common elements. Colleges would then be able to compare the needs of local technicians with the national pattern and identify how far, if at all, they differed and cater for these differences.

Professor K J Shone,
Graduate Business
Centre, The City
University.

TECHNOLOGY, ECONOMICS AND EDUCATION

"I am delighted to open discussion on the interaction of Technology and Economics and the need for Education to secure fruitful union of our undoubted national skills in Technology and in Economics. My interest in this topic arises from my wartime experiences as a sea-going engineer. This sea faring experience after a Cambridge University degree was an excellent new liberal education - wide ranging, intense and relevant. It also brought me to realise that so many of the breakdowns, losses and poor economic performance of ships did stem from lack of trained people. The lack of engineers with good certificates was often blamed but probably much more important was the fact that engineers on merchant ships changed frequently, and they literally took information and experience from the ship and left very little behind for their successors who thus had very little information about the particular ship they were in or of its technical idiosyncracies. The opposite of a University of which a wit remarked (was it of Oxford!) there is a great deal of accumulated knowledge there because all students come up with some and take very little that is useful away! I, perhaps priviliged, spent many happy hours probing ship problems, and for me it was a very helpful training situation. This was however unusual, and study on the job very rarely contributed as it could to the personal development of the engineer or to the better running of his ship, because his study is all ashore with books, and teachers solving classroom problems. There was no in plant training on the economics of the operation or mechanism for discussion of operational improvements. Clearly this is true at sea unless the teacher sails with the ship, which rarely happened; but it also applies to factories ashore. Too little of the work in colleges is related to problems at work, and especially to innovation and economic operation.

The Difficulty of Integrating Technology with Economic and Social Requirements

One sees the interaction of social, economic and technological problems throughout the world. The process of setting up a new steel plant illustrates the difficulties.

I will omit consideration of the fact that often politico-economic considerations of the type - "it is this area's turn to have a new plant" impose undesirable technical and economic constraints. Generally education and training problems are well focussed before a contract is awarded, often due to Government pressure. Typical aims are to avoid overmanning and operate profitably; to get the plant commissioned rapidly (as a slow start may easily increase the initial investment so much that the plant can never become economic); to develop control systems to ensure the technology makes the best use of the market constraints. For these purposes ambitious, but very worthwhile Education and Training programmes are developed.

In practice the picture soon distorts, possibly because it is comparatively easy to design organisations as a collection of people but to organise systems to assist the technology is much more difficult. Time pressures encourage wishful thinking, and expediency leads to shelving rather than solving of the more difficult and crucial problems. Thus automation may become an end in itself rather than a service to technology. Management systems, too, seem to be designed for the controllers, from the top down, rather than as a means to exploit the technology, or enhance the service. Our value system encourages close contact with the top, rather than group effort at the shop floor level, which is a pity because it is there the difficulties and the profits originate. We tend to become beaurocrats rather than technologists.

The tendency under pressure to forget that the purpose of technology is to be productive is not confined to administrators; engineers too are quite capable of collecting equipment for its own sake instead of for a social purpose. Hence a chief accountant's query as to what makes a £50m maintenance workshop necessary cannot be answered in terms of cost/benefits. Engineers too can be administrative empire builders and want to make sure that they are "in" on every procedure, so that the situation of too many hands on the steering wheel arises, which makes it more difficult to get the best from the equipment they control. Incidentally overmanning has two effects - high overhead labour costs and reduced equipment outputs, and the latter is most important in Britain.

The Problem for Education

When you see things going wrong in this manner, when for instance management studies are used to build Parkinsonian empires, to serve the beaurocrat rather than the technology; when the techniques expand overheads rather than raise productivity, what should the teacher do? The concepts taught are not wrong, for the same material has been used by not dissimilar plants. One plant achieves substantial improvements in efficiency, while another expands management services and seems to add confusion in doing so. The value of education and training depends on how it is used and the attitudes of supervisors and managers to innovation. What can be done depends on how operating managers use education. If management see education as a matter of gaining certificates and best left to the specialists, difficulty and distortion is likely to arise. On the other hand if management visualise colleges as a knowledge machine which can help (a) to provide education which develops the right climate and attitudes for innovation and productivity, and (b) to assist training groups to solve operational problems - then striking improvements have been obtained. Prerequisites for success are a positive attitude to innovation, a cross-fertilisation of need with ideas, and the choice of the simplest solution. Incidentally you need better educated people to identify the simpler solutions.

Present Shortages

There is a lack of tactical training that is geared to achieve solid objectives of real economic value and achieve quickly measurable improvements.

Secondly, and it is a very different problem, there is a real need for strategic education so that organisations are emotionally and intellectually educated to use technology economically and to innovate for society's needs. In fact too often our educational system, which is geared to subjects, courses and certificates falls between both needs and fails to cater for either. Industry also rarely has the time and know how to do so, daily pressures prevent them. To summarise consider the national problem of investment. Our failure has been to over-simplify the need. Perhaps in order to generate political slogans, investment becomes an economic tool or investment may be a social tool to maintain employment which is also a short sighted policy. Investment to increase the volume of gainful employment is more realistic, and investment which serves whole geographic groups within the national and international economic community makes much more sense. Thus an approach to investment in technology is required which recognises that finance and politics, sociology and economics are interlinked with technology. They cannot be separated.

The Over Specialisation of Liberal and Economic Studies

Engineers have long recognised the need for non-technical subjects. Liberal studies have been included to give a broadening element and develop social attitudes; and engineering economics or industrial administration have been included in the curricula to assist the productivity of technology. But these subjects have rarely made any worthwhile impact in the 40 years they have operated. They are given by economist or liberal studies colleagues as parellel subjects and so contribute to expansion of an over-loaded curricula. In USA these subjects are also given, often with similar titles eg Engineering Economics becomes Engineering Economy there. But in America the reason for Engineering Economy is not to add a broadening subject but rather to show how technology must operate. For example that investment in it can only be justified if there is a profitable return, and that the return must be made in time at an economic level of quality. Without that a technological project should be dropped, and another with better prospects chosen. The notions of timeliness, economic quality, flexibility and search are given parity with that of profit. Perhaps rather vulgar notions to some of our colleagues. The liberal studies and engineering economy which in Britain are considered additional subjects to counter balance a preoccupation with technology are seen in America as tools which enable technology to play its proper social role. Unless we accept this broader and integrated approach to technological training our people will be prey to every cure-all quick technique, because they are not equipped to work through its implications. If education is to assist a technological integration there are some things that should be done.

1. We need as teachers sociologists and economists who understand how their subject may assist technology and innovation. I expect it is easier to develop engineers to teach these concepts than to give accountants or economists the necessary backgound of technology.

2. We need more accent on problem solving and treatment of economic and sociology as practical tools for that purpose. If this is to be realistic and useful, students must actually see problems solved and so teaching must relate to a local level and conditions.

3. Thirdly such education needs to be timely in the sense that we do not want son telling dad what to do - hence an expansion of post experience training for older people is implied.

The Special Role of Technical Colleges

I have been abroad a good deal recently and when I returned it struck me that perhaps the Universities and Polytechnics were getting so subject specialised, searching for academic quality, and orientated to advising at macro level, that they were unlikely to contribute to the kind of exercise I have in mind. We need to help people be successful in their own lives, not manqué ministerial advisers. Problem solving should be based on grass roots exercises, preferably in local Government, industry or commerce. But from a few contacts I hear that the Technical Colleges are in fact already making a real contribution in an integrated, practical and timely way at operating levels. I am not certain of the present state of play but I wonder to what extent colleges do have resources, or encouragement or the will to play an expanding role in facing the educational problems of Technology and Economics that I have outlined. May be lecturers need more time and assistance to do so.

Development of Engineers to meet the new Economic and Social Demands

Within my university we think we need to give successful lecturers in technology time to take an M. Sc in Industrial Administration, and then with the help of a Management Trainers Workshop, and their previous, considerable industrial experience they will be equipped to consider the problems of Economics and Technology now, and teach our students to take a positive attitude to them. But we have a great deal of catching up to do. We must also develop education for problem solving and innovation in Technology particularly for older people.

We need more post experience courses. Further Worker Participation (whether future Governments be Labour or Conservative) is likely to be an increasing reality. If Worker Participation is to be geared to the realities of technology, and not just a political - sociologist's cure-all., then the kind of education I have described must be implemented at the supervisors - middle management level. For it is there that the problems are and solutions for technology must be found, and where participation can be made effective.

The need is for more grass roots education and training of the types described and I feel the Technical Colleges are the places for it. Perhaps this is a reactionary vision of a return to a working man's institute of half a century or more ago. But nevertheless I see the need for much more local discussion, of local problems by leaders at all levels of society who see how technology should promote our social and economic welfare."

Discussion Arising

management consultants

Professor Shone was first asked to give his view of the use of management consultants to solve problems in educational institutions. He replied that he was now altogether in favour of this. It was far better to try to set up problem solving systems within the college than to bring in outsiders who might not fully understand the educational context of the problems being investigated. One of the possibilities which people in educational institutions might consider was whether their expenditure in particular areas was really worthwhile. For instance, Professor Shone thought that much administration was superfluous. There was no reason why letters could not be written in longhand and photocopied, rather than having them typed by a secretary.

reaction

Was it possible to include in a project an analysis of the reaction of people as one of the parameters to be considered before a project was undertaken? Professor Shone replied that a once for all analysis was unlikely to work as political and social circumstances changed so rapidly that it was probably impossible to forecast a long chain of events. For this reason building and maintaining of the climate and personnel for innovation was an essential and continuing aspect of the problems solving process.

diversification

The discussion then turned to the possible channels along which engineering and technology departments might develop in view of the falling student numbers. The fear was expressed that if local education authorities cut back on engineering and technology places in the colleges, it might not be possible to build up again quickly should the need arise. Professor Shone suggested that one answer might be to expand courses in these fields to include more of the managerial and organisational aspects of industry, particularly in courses for rather older students than at present. This would mean a move away from traditional Diploma type courses to more integrated courses which included both technology and sociology

Such courses would require close liason with industry to discover what its needs were. Colleges of technology had an advantage over other educational institutions in that they were both local and flexible, able to respond quickly to changing needs. Some members, however, disagreed with the view that colleges of technology were flexible. In their opinion, they were now rigidly controlled by RACs. Students, moreover, seemed to be interested in whether the course they followed led to certification which would improve their wages - they were not interested in education for its own sake.

student - centred learning

Professor Shone indicated that the answer might lie in the college developing as a catalyst to learning, rather than concentrating solely on teaching. This could be a tool, helping people to learn about what interested them, rather than imposing courses upon them.

attracting students

Finally, the discussion turned to ways in which the community might be encouraged to use the college. On the question of attracting all types of students into college, a member said that Loughton College was being thrown open to the public on a Saturday morning. Three hour courses were being run, and 600 people were expected, each paying 10p and being registered as students. Staff would be given time off in lieu. It was hoped that this exercise would encourage some people to enrol for other activities.

Professor Shone was then asked for his view on how the image of engineering could be improved so that it would attract school leavers. He saw no short term solution. In the long run, perhaps if engineering were put back in its proper perspective alongside economics it would given engineering the freedom to make a proper contribution to society. At present, managers tended to take either an engineering perspective (ie to have the best engineering solution, whatever the cost) or an economic view (ie to have the best financial solution) of a problem. The approach which was needed was one which combined the two sciences, and if this occured, more young people might enter engineering because technology would be seen to be socially important. The speaker was certain that an increased emphasis on technology and engineering was essential for economic survival, otherwise Britain would become an off shore depressed holiday island for Europe.

PROJECT A

"To examine the present situation in the provision of courses of engineering and applied science, to identify trends and to comment on likely effects on the organisation of colleges and departments"

J Latcham, Staff Tutor, Coombe Lodge

Introduction to the Project

Mr. Latcham asked members to consider two key issues. First, to what extent were the national tendencies outlined by Mr. Hammond replicated in members' own colleges? If it was possible to identify colleges which had not suffered the national decline and the reasons for this, it might be possible to apply their criteria for success to other institutions and perhaps help to halt the decline.

Secondly, members were asked to consider the extent to which the decline represented a change in the employment patterns in the engineering and technology industry and the degree to which this was due to the rejection by young people of engineering and technology as a field of employment.

Several members had prepared discussion papers describing the condition of engineering and technology in their own colleges and three witnesses representing the TSA, employers and employees visited the syndicate groups to answer questions about the influence their own areas of work would have upon FE in general and technology in particular over the next five years.

A summary follows of some of the points raised during the witnesses' visit to one syndicate group:

Syndicate Discussions with Witnesses

E R Lewis, Chief Training Consultant, TSA

Firstly, Mr. Lewis was asked by the group to give a brief outline of the Training Services Agency, its structure and how it came into existence. Then attention turned to the Training Opportunities Scheme. Mr. Lewis said that it was planned that the Government provision of training for individuals would continue to grow and that 100,000 places should be available by the end of the decade.

In the past, the direct provision of training by the Government had grown more as a social than as an economic requirement. The training centres set

up in the 1930's were to help the large number of unemployed and also people returning to civilian life from the armed services. There was strong emphasis on providing the kind of training which would lead immediately to employment and there has been a good record of placement in jobs of individuals who had undertaken such training. Differences of view had grown since the War in the OECD and in particular, Sweden had developed an extensive system of Government provided training on a large scale relative to the population. The development of TOPS has been directed towards providing much wider opportunities for individuals in line with their own aspirations. A substantial percentage of TOPS trainees have in fact undergone courses in FE Colleges and where vacancies exist in Colleges, such as in engineering and technologies departments; it makes sense to use them in this way.

Mr. Lewis was asked how far TOPS provided for the 16-19 year olds. He said that the needs of this group had been of great interest to the TSA and was one of the priority areas in their first Five Year Plan. It was felt that the opportunities available to the bulk of 16 year old school leavers were limited and this contrasted starkly with the resources made available to those who continued in full-time education. At the same time, it had been necessary to move with caution and in co-operation with the DES so as not to disrupt the Further Education Scheme now available to such young people. The Agency was about to issue a Report on the needs of the 16-19 year olds for consultation and hoped that many people would comment on the ideas contained in this report. Some action had already been taken. A number of courses have been started under the Wider Opportunities Scheme particularly to help young unemployed or those who had not clearly decided what kind of occupation they wished to follow. These courses were also available for adults who were wanting to rectify wrong choices or who had become redundant. The courses were primarily aimed at teaching people how to learn. They were not directed at particular skills or particular occupations but provided a range of experience in different skills and practice in some depth in one skill. The approach was as far as possible tutorial and courses lasted about three months. The intention was that the trainees on the course would become acquainted with the nature and demand of certain kinds of jobs and once having made a job choice, would be better prepared to master the job they had chosen. One of these courses was being run in a Further Education College with great interest and enthusiasm from the college staff. Early indications were that these courses were being successful but they were costly in terms of student staff ratio.

craftsmen

Commenting on the future demand for craftsmen, Mr. Lewis said that whilst it was expected that the number of craftsmen needed would decrease, there were also signs that the number of young people applying for training was going to be less than were required and it could be in some cases that it would be necessary to reorganise work by breaking skill jobs down into a number of components which less skilled people could carry out. We must remember that some of the very able youngsters applying for apprenticeships in the 1950's

and early 1960's were now staying in full-time education and in some cases going on to Universities; and many who had entered industry in this way were later promoted to technicians and have finally risen to higher responsible jobs in industry. This change of situation in itself has training implications.

technicians

On the question of technicians, Mr. Lewis said that the TSA had recently done an analysis of likely technician requirements over the next ten years and this seemed to suggest that it was not clear how the growing demand for technicians was going to be satisfied. By 1980 it was estimated that there would be a demand for 65,000 new technicians each year.

J A W Deboo, Group Training Manager, Baker Perkins Holdings Limited, Peterborough

manpower forecasting

Mr. Deboo first commented on the difficulty of forecasting manpower needs. Not only was industry a mass of different types and sizes of firms with vastly different requirements, but new product and market research was continually leading to technological developments which affected the number and quality of people needed. Another factor which influenced manpower requirements was our success in winning contracts abroad. This was particularly true in the engineering industry, for 60% of goods manufactured in the engineering industry were exported. A single contract might create 500 jobs for five years, yet success was difficult to predict as we were competing with other countries. Conversely success in an overseas market might involve setting up some manufacturing facilities in that country and would therefore not always involve more production and more jobs back at base.

demand for craftsmen

Asked whether there was a national need for a certain number of craftsmen to be trained in transferable skills, Mr. Deboo said that in his opinion there was a certain figure below which we must not fall. The need for craftsmen would continue, but, like Mr. Lewis, Mr. Deboo thought that the requirement might be for fewer than at present. They would however be of increased importance, and if industry did not train sufficient, then the Government, through the Training Services Agency and the Industrial Training Boards, should step in.

Speaking of changes in the type of recruits to craft jobs, Mr. Deboo again agreed with Mr. Lewis that the quality had fallen, as many of the brighter ones were now remaining at school to take CSEs and GCEs with an expectation of jobs above craft level. Some of those applying for craft apprenticeships had difficulty in coping with even low level Further Education courses.

training

With regard to training at the professional level, Mr. Deboo remarked that many firms, having rejected sandwich scheme sponsorship because of its high cost, had turned to graduate recruitment. He thought that some companies were now becoming disillusioned with the calibre of graduates and would again try sponsorship with recruits at ONC/HNC level doing sandwich courses.

Mr. Deboo said that the attitude to further education held by some employers had been soured because of the attempt made by educationalists to build too many "bridges" for the students, so that one successfully completed course would lead to another and so on! This enabled the students to progress out of the work for which the employer had recruited them. BEC and TEC would probably further this tendency.

Mr. Deboo was then asked to say which type of course would be most heavily in demand over the next five years. He replied that he thought the greatest need would be at the two extremes - craft level courses and technologist level courses. Technicians would always emerge from craftsmen who were particularly able or technologists who did not quite make the grade. He then spoke of the pressing need for more and better training for designers. Such people should be given appropriate status and pay, whether or not they had a large team of people working under them. Encouragement should be given in schools to the idea that being an engineer or a designer in industry is a worthwhile occupation.

E Mowforth, Chairman, National Technical Sub Committee, Amalgamated Union of Engineering Workers

Mr. Mowforth said that his union had no National policy regarding training. This would be too prescriptive, restrictive and would militate against the best local practice. Speaking of the attitude of trade unions in general to training, he said that if they did hold any general belief it was that people must be trained so that they can get the most money possible for the job they do. Union concern with training was, in any case, given lower priority than improving conditions of service for people already in the industry. Often the workers themselves were not interested in training. Many did not find their jobs fulfilling and regarded them simply as a means of getting money. Mr. Mowforth said that as long as this situation existed their view of training would be unenthusiastic.

Attention then turned to university courses. Some members thought that students would prefer courses to be more related to industrial application. On the other hand, some students rejected university courses because they believed that universities were a tool of capitalist industry. Mr. Mowforth said that he would like every student to spend a period in industry before entering university. A member suggested that engineering recruitment would improve if it were 'sold' to the public as an exciting, creative subject, perhaps through a television series akin to Bronowski's "Ascent of Man" documentaries. Mr. Mowforth agreed, but warned that success would depend on whether the same style and atmosphere could be maintained on courses themselves.

Mr. Mowforth was then asked whether the Government centres for skill training were supported by the unions. He replied that they were, as it was a useful answer to redundancy. There were some problems, nevertheless.

Dissatisfaction was often expressed among people who had been doing a job for many years, and had served a long training, when they received the same pay as people who begin the same job after a six week training course.

The unions' attitude to "taster" periods in industry for youngsters still at school was then discussed. Mr. Mowforth said that there was a general suspicion of them, as they could be a source of cheap labour. In order to satisfy the unions, a complex system of safeguards therefore had to be set up. His personal view was that it gave 16 year olds some idea of what industry is like, in terms of working conditions, industrial relations and so on.

Syndicate Reports

Members found that in general there was no significant departure from national norms in their own institutions and tried to identify new areas of work which might be further developed.

day release

Syndicates noted the reduction of students enrolling on day release courses. Reasons postulated for this were:

(a) recession in the engineering industry,

(b) shorter training schemes,

(c) reduction in skill requirements - the manufacture of many products was being simplified and craft jobs were being replaced by jobs which needed skilled operatives with effective but narrower training,

(d) the reluctance of older workers to attend colleges due to consequent loss of bonus which was not compensated for by the advantage of possessing a qualification,

(e) the reluctance of managers to release workers over the age of 21 because they are paid full rates,

(f) the reluctance of small firms to release any workers as each employee performs a substantial percentage of the work of the firm,

(g) the narrowing of differentials which 'devalues' the possession of qualifications,

(h) the unattractive image of the engineering industry which deters potential entrants.

The potential effect on the colleges of these factors might be:

reduced staff requirement and a gradual reduction of the establishment, probably through natural wastage,

(b) a reduction in the employment of part time staff, as these are the easiest to get rid of,

(c) low student staff ratios,

(d) the dynamic 'selling' of courses and the consequent enrolment of some unsuitable students, which would lead to wastage,

(e) under-used resources,

(f) more staff training and development activities,

(g) the creation of more senior posts.

block release

Block release courses were viewed as having a limited life. They tend to be created to meet a particular local need. Their popularity is falling generally, apart from one or two specialist courses at certain colleges, e.g. Heating and Ventillation Fitters and Fitter/Welder courses. They are not very popular with industry, apart from firms engaged upon site-contract work, although students tend to prefer block release to day release, especially where travel problems exist.

short courses

Syndicates thought short courses were a useful development. They could be divided into two types: those for operatives needing skills in one job, and those for mid-career personnel, e.g. in "Quality Assurance" or "The New Safety Act". While these courses were not regarded as a long term solution to the problem of declining student numbers, they were still needed. As they required great flexibility, it might be necessary for the college to provide only accommodation and facilities, with part time lecturers coming from industry. Such courses might also be utilised as introductions to longer courses.

link courses

While many link courses were already running successfully, one syndicate felt that they ought to be treated with some caution. Due to the economic situation schools might become less co-operative in future.

foreign students

One syndicate suggested that in certain localities courses for immigrants and courses for overseas students had potential.

Other external factors which would affect the provision of courses were:

(a) industrial changes - the increased number of processing industries warranted an investigation into their needs for education and training. Secondly, the need to maintain the continuous working of sophisticated plant indicated a need for courses at technician level to impart greater diagnostic and maintenance skills.

(b) the effect of TEC and the currency it develops amongst employers

(c) the effect of the TSA which might possibly lead to a new emphasis on the training element of courses.

Suggestions were made of ways the colleges might have to react to the new situation:

(a) Redeploy teaching staff. Engineering staff may move from specialist teaching to a more general involvement with other courses. Teachers may need retraining, particularly should there be any suggestion of moving FE staff into the schools, where a teaching certificate or diploma would be essential.

(b) Attempt to expose general subject course students to the flavour of technology.

(c) Try to improve the image of engineering and the engineering industry in order to affect recruitment.

(d) Develop different courses in order to offer a saleable product.

(e) Rationalise 'fringe' training establishments which perform the role which FE is already undertaking.

PROJECT B

"To consider anticipated changes in the provision of courses in technology over the next five years and to identify factors which should be examined in planning college development in this area of activity"

W. M. MacQueen
Member of
Construction
Industry Training
Board

Introduction to the Project

"Some aspects of anticipated change - the financial and statistical perspectives - have been dealt with already in this conference. I shall therefore concentrate on possible developments from the human aspect. Students, if we consider them as an entity, are possibly the only stable element in what we do, and we may have emotional, sentimental and instinctive ideas about our relationships with them.

One of the things which we must consider is humanity in relation to technology. We must ask ourselves whether we are able to control technology. Before pronouncing on the future we must emphasize that there is a need for technology - it has brought us wealth. But can technology be harnessed better than it is at present to ensure survival and the improvement of the quality of life for the individual?

In the latter part of the nineteenth century Herbert Spencer listed the essentials of learning. He put first the knowledge necessary for survival, then knowledge necessary for raising a family, earning a living, taking part in society, and, last of all, the knowledge necessary for leisure. Society today, by its use of technology, is producing leisure in quantities which we cannot afford and this is something we must consider in relation to college development. With regard to the quality of life, we should try to ensure that the precious cohesive elements, which hold society together and make life good, are preserved. These elements are invariably concerned with quality. The improvement of the individual should be at the back of our minds as teachers, constantly, no matter how limited the ability of the student. As trainers we tend to be interested in what the trainee can do, i.e. in his manipulative skills, rather than in him as a person.

Certain factors have recently changed the student self-image: the lowering of the age of majority to 18; the reduction in the duration of apprenticeships; the granting of more political power to the student body. These factors have had a subtle but nonetheless pronounced effect on teaching and training for technology.

What characteristics should the educational system impart to the individual student at technologist, technician, craft or operator level? Any course must take account of certain things which are never written into any syllabus. Two facts must be remembered. Firstly, that individuals make nonsense of any classification. Secondly, that there are as many people below average ability as there are of above average ability, yet in the educational world we tend to be concerned only with those of above average ability.

Who is the paymaster in the education world - society or industry? Society obviously has an interest in character quality. It tends to pay for technical further education. The qualities I feel society wishes colleges to impart are honesty, integrity and competence, for these are directed towards social well-being. The subtle relationships which lecturers have with students have a great influence which tends to be overlooked.

The character qualities required of students by industry tend to differ to some extent from those demanded by society. Industry wants its technologist recruits to have determination, drive, push and initiative. Reliability and a sense of responsibility are demanded of the technician. For craftsmen, operators and labourers the requirements are manual skills and contentment. In the commercial world, there is a need for the executives to have business acumen. At lower levels, other criteria apply.

There are degrees of competence which should be considered in terms of society and the individual. In a democratic society there is no limit to the degree of competence which should be attained, other than that set by the individual and his personal limitations. For industry and commerce the degree of competence needed is defined too often by the compass of the post the individual is to occupy. Employers sometimes complain that their staff are over educated.

In Project B members are asked to consider anticipated changes in the provision of courses in technology over the next five years and to identify which changes should be examined in planning college development in this area of activity. There are a number of questions which syndicates should try to answer:

(a) To what extent should society finance the teaching of technology for the benefit of the individual?

(b) Is provision for the acquirement of vocational skill at all levels a reasonable social responsibility - a fourth 'R'?

(c) Can the needs of individuals, of society and of industry be harmonised better in a structure which recognises the differences between education and training and the need for high quality and effectiveness in both?

My belief is that we are not educating the craftsman or the technician properly at the moment - and nor are we training him properly.

At my own college the Academic Board is presenting to the Governors at their next meeting a paper projecting plans for the future. These plans are peculiar to the institution in that we have five annexes situated away from the main complex. The plan would involve new building to take in these annexes. In the plan we have tried to cover some of the questions outlined above. Syndicates might consider what their own academic boards might be doing in the future in relation to this type of exercise.

If we envisaged a model of the situation as a triangle with industry as its base, technical education forming one side and training the other, if we attach establishments to each of these three aspects, we have a type of structure which may overcome some current difficulties, e.g. the problems which occur in off-the-job training. The college could provide the theory and technology in the form of technical education. Training could either be in industry or in specially created training units. The consolidation of this learning would take place in industry or commerce. I believe that over the next five years we will see increasing separation of learning of practical skills from learning of technology. This will be unfortunate, but an attempt to ensure that industry once again fulfils its responsibilities by providing opportunities for learning skills on the job would be all to the good.

The Hudson Report produced a series of diagrams in hexagonal form to illustrate well balanced economies with equal importance being allocated to manufacturing, construction, transport, commerce, services and agriculture. Yet our present structure in the UK is heavily weighted towards services. Despite what we may think of this report, if we looked at some of the problems of the country on this macro scale, we might possibly develop an education service to meet them. The Report says that a country with 84% of its exports made up of manufactured products cannot afford an inefficient secondary sector. There are dangers that we might gear educational provision to the situation which already exists, and train more and more people for the services industries, because the demand exists, rather than act less comfortably perhaps, for the general good of the country. To maintain or regain competitiveness, cost advantage, reliability and innovation are needed. This will not be achieved unless we have highly competent engineers. The education service has a grave responsibility in ensuring that they are produced."

In the second project, members were again able to question a number of witnesses - this time from TEC, the Engineering Industry Training Board and City and Guilds. Before visiting the syndicates, they spoke briefly on their plans for the next five years in a plenary session. Mr. MacQueen also visited the syndicates, acting as a representative of the Construction Industry Training

Board. A summary of the introductory statements given in plenary, followed by a synopsis of some of the points brought up in one of the syndicate groups follows:

M Emerson, Principal, Wigan College of Technology and Founder Member of TEC

For his opening remarks Mr. Emerson concentrated on that part of TEC's terms of reference which relate to "the development of a unified national system of courses" for technician education." The term unified is worth examining in some detail since it is one of the key words underlying the policies which the Council wishes to see developed.

awards

The present systems, typified by National Certificate and Diploma awards administered by the Joint Committees, and Part I, II and III Technician Certificates administered by the C & GLI and REB's, will be brought together to produce a single validation system under TEC. Awards of Certificates and Diplomas, and Higher Certificates and Higher Diplomas, will be within a framework of a unit/credit system in which there will be immediate connections between the various awards. For example a student who obtains a Certificate award may by further study at the same level take further units to obtain a Diploma award, or alternatively take units at a more advanced level to obtain a Higher Certificate award. Similarly a student, initially embarked on a Diploma programme of study, may still be eligible for a Certificate award if he does not meet the full requirements of a Diploma award. Unification means more than this, however. National Certificates and Diplomas are currently tied to particular modes of study; a Certificate is obtained by part-time study; Diplomas by sandwich or full-time study. The Council's view is that the unit/credit framework will make it possible for the awards to be obtained by any mode of study, or indeed by combinations of modes of study. Although it is clear that many programmes of study will, as is the case now, be organised distinctly as part-time, sandwich or full-time, the Council will encourage innovation which will allow colleges to organise their programmes in a way best suited to their own students' needs, and the needs of their own local or regional industry.

programme areas

Another facet of unification is that different programme areas will interact. At present it is very rare for colleges running, say, an HNC in Engineering and an HNC in Electrical and Electronic Engineering to be able to organise common learning situations or examinations, even when parts of their programmes are identical. With the development of a unit system, a credit gained in one programme area may be valid for another, and therefore valid for an award in either. The word "may" is emphasised since it is one of TEC's aims to produce an enabling framework, not a prescriptive one. It will be a matter for a college to decide on the extent to which it can organise the unit system for its own programmes, to capitalise, for educational as well as economic reasons, on common studies covering several categories of technicians.

group schemes

Where it can be arranged TEC will encourage colleges to plan and operate group schemes. It will be possible for colleges to submit schemes jointly and to operate joint programmes if it suits their locality. A note of caution is necessary, since one of TEC's aims is to enable the individual teacher to accept greater responsibility for what he teaches and the way in which this is assessed; clearly group schemes might inhibit such a trend."

local initiatives

One of the inherent characteristics of our further education system is its variety - colleges vary, and the industries they serve vary. Mr. Emerson argued that it is far better that decisions be taken at grass roots level where the local constraints are known, than by some central body which lacks full knowledge of the backgrounds against which an individual college has to work. In this regard TEC will give strong encouragement to the involvement of industry in curriculum development, and will be looking for evidence of this in schemes submitted to it by colleges. The Council believes that colleges will welcome the opportunity to devise programmes of study which have genuine relevance to what local industries want, both in terms of content and also in manner of organisation. Here again the process of unification can be seen to operate; the potential divisiveness created by the institutionalisation of training as an industry responsibility and education as a college responsibility, can be disarmed by a system which will encourage collaboration.

other levels of work

A question which Mr. Emerson had often been asked is why one single FE Council had not been set up to cover the whole spectrum of FE work. In his view this was entirely a matter of size. Even the TEC/BEC "division of labour" is a sensible one in the light of the practicability of changing the present systems. Nevertheless colleges should not be inhibited from developing ways and means of blurring the edges between, for example, craft and technician education; there is nothing in TEC policy which would prevent a college from organising common units of study for craft and technician students where this is educationally and/or economically desirable. At the other end of the spectrum there is clearly scope for developing common units for, for example, Higher Certificate/Diploma students and those involved in Dip.HE or degree level work. Mr. Emerson noted that discussions are already taking place between representative of TEC and the CNAA to consider this delicate interface between THD and Dip.HE; one important point of principle has been established that it would be totally wrong for two programmes of study to emerge, albeit similar in content and organisation; the first leading to a THD validated by TEC, the other to a Dip.HE validated by the CNAA. In no sense do TEC or the CNAA intend to compete.

professional bodies

Similar arguments apply in respect of professional bodies and Mr. Emerson hoped we could look forward to furthering the trend of acceptance by the professional bodies of qualifications obtained under TEC. It has always been TEC's policy to have professional bodies represented on its committees, and

detached consultations would continue to take place both within the official Council committee structure and without.

standards

In summary Mr. Emerson returned to the theme of enabling rather than prescribing. The Council was very mindful of the many constraints with which colleges have to contend in planning and operating programmes of study which would match the needs of students and the industries who employ them. He argued that the real arbiter of standards is the teaching profession itself, and TEC's framework has been devised in recognition of this.

Syndicate Discussion

Mr. Emerson was asked what the effect of the new national conditions of service would be in view of the fact that TEC courses could involve a great deal of curriculum development work by colleges and that the new conditions gave an allowance for curriculum development work against class contact time. Mr. Emerson replied that the involvement of teachers on such work might result in new learning methods being introduced for students, eg. library assignments, project work, in which teacher involvement might be minimal. Some conference members suggested that leaving the students without a teacher in charge would be an open invitation for them to create havoc; others were concerned about the possibility of accidents. Mr. Emerson reminded the group of TEC's emphasis on students becoming self-reliant; whilst it was true that recent safety legislation would create new problems he was not suggesting that students be left with no guidance, or without any staff supervision whatsoever.

A member thought that in view of the economic difficulties faced by colleges they would have to opt to do standard programmes rather than spending their time devising their own. Mr. Emerson replied that while this might be regrettable, it was far more important that colleges carried out their own assessment.

This led a participant to suggest the need for a national examination system in order to give an award a currency which would be recognised throughout the country. Mr. Emerson disagreed. Although it was essential to have a nationally recognised qualification, this did not necessitate a national examination. After all there was no measurable way of establishing that university degrees in different subjects were of the same standard. One could only assume that given students with broadly similar entry qualifications, doing a similar number of hours of work, with similar demands made on them, by teachers of good quality, the standards on leaving the programme of study would be roughly comparable.

J A Moon, Chief Education and Training Officer, Engineering Industry Training Board

Before addressing the conference, Mr. Moon said that EITB plans were currently under review and some of the possible developments he would describe might not in fact be accepted.

On levey exemption, Mr. Moon said that about 65% of large employers in the engineering industry (i.e. those with 500 or more employees) may become exempt but only 18% (now revised to 25%) of the smaller firms were likely to do so. This gave some indication of the training pattern in the industry.

objectives

Mr. Moon then listed the five major objectives which influenced the planning process of the EITB:

(1) To help secure in the industry the key aspects of the training situation. In effect this meant the skills which take a long time to acquire, and are therefore costly to individual firms, but are important because they represent a strategic requirement of the engineering industry as a whole.

(2) To help companies to plan and make the most effective provision in relation to their corporate aims.

(3) To help firms in the employment and utilisation of manpower.

(4) To provide training facilities and information for the industry as a whole which an individual company could not afford or would not consider.

These objectives set certain constraints. They mean that extra resources are needed in some areas, such as technician and technologist training. The proposal to continue to support group training schemes, of which there were 170, was to be put to the Board.

direct training

Mr. Moon then described the Board's policy on direct training. The EITB did not carry out any direct training in areas where other bodies do it satisfactorily. One of the fields in which the Board was directly involved was in a scholarship scheme which was provided for initial training of college based sandwich course students in engineering disciplines. These amounted to about 150 each year, and it was proposed that the scheme would continue. A second area of direct training in which it was proposed that the Board should become involved was for training officers. Of the 3,600 in the industry, only a quarter of them had undertaken any formal studies since leaving school at about 15. The proposal which was to be made to the Board was that a series of postgraduate scholarships should be set up, each lasting two years, and probably associated with a polytechnic. By training graduates and then releasing them on to the market the quality of training officers in general might be improved.

The concept of adult apprenticeships had been proposed and deferred. Trade union members in the industry believed that the timing for this was wrong and there would be too many pressures against it operating successfully. As far as maintaining the supply of young recruits was concerned, contingency planning was already in hand to deal with the possibility of a severe downturn in the economic climate which would reduce the numbers coming forward. However, the indications were that this situation might be avoided. The Board has been carefully monitoring the possible intake of new recruits this year and on the basis of statistical sampling it would appear that the engineering industry may have learnt some lessons from the past and would appear to be taking in the same number of new recruits at least as last year - about 23,000.

Associated with developments in the technician field was the possibility of the EITB funding some experimental courses designed to attract young women into the industry and to overcome the prejudice which exists in some quarters against taking women students.

In the field of student engineering training it was proposed that the Board should introduce a certification scheme which was being debated with the CEI. There was no intention of interfering in firms' training schemes, but it would be useful if the Board could say that if people who came from a certain company they had received an adequate training.

TEC

The EITB regarded TEC as a possible jewel in the education system. Already working parties had been set up with industrialists to consider objectives for the new courses - what in fact was required of young people entering employment and what was needed in terms of end behaviour following training. Mr. Moon said that the findings of the working parties would be made available to the various groups working on aspects of curriculum development in the hope that they would influence the development of courses.

State funding

Another area being discussed was the possibility of the EITB provoking a major debate over whether the State should accept responsibility for the funding of first year craft and technician courses. The present situation was one of considerable inequity. Not only did different firms have different attitudes to training, but many young people received their education and training free from the State. There were good economic and social reasons why the first year, at least, of all education and training should be provided free by the State.

careers advice

A further initiative was in the field of careers advice. Until now, the Board had not been involved in this area, believing that it was the responsibility of other institutions. However, the pressure on the Board to do something in this area had been so substantial that there was a need for review. The possibility of setting up a new EITB department concerned not with the activities of particular companies but with promoting the idea of technology as a creative activity was being considered. Under such a scheme the Board might help to

fund link courses, science fairs and other activities which attempted to demonstrate the applications of technology.

energy programme

A final proposition for the future concerned the energy programme. The Board's attention was focussed upon this in 1974 when it was asked to take on all the firms which were concerned with site erection of power stations, petrochemical plants, breweries, food processing plants and so on. Mr. Moon said that the indications were that 16,000 extra employees would be needed each year in these industries. The Board had been set the problem of deciding how these people could be trained. In addition to operating grant schemes, it was almost certain that an industry apprenticeship scheme would be set up. As many of the entrants would be itinerant, working on projects for short periods and then moving on to something else, it was likely that three centres would be established in order to give young people a permanent career in these industries.

Syndicate Discussion

The group asked Mr. Moon to elaborate on his remark in plenary that TEC would be a powerful instrument in helping industry to influence courses. He said that this influence would be at two levels: national and local. At the national level, the Board should try to set down in a meaningful way what was required and should promote the same approach in the local situation. One of the main problems was that industry had a tendency to think only in terms of existing courses. Mr. Moon emphasised that at the local level liaison between colleges and industry should not necessarily be in the form of advisory committees, which were often of little value, nor solely with Training Officers. It was important to hold discussions with industrialists at a high level concerned directly with the technology used.

Next, Mr. Moon was asked whether the most pressing need would be for technicians or craftsmen. He thought that the demand for technicians would increase, particularly as production costs increased and the tendency for industry to become less labour intensive would reduce the need for craftsmen. However, different parts of the engineering industry might show different trends, so colleges would have to base their decision on whether to run more craft or technician courses upon the local situation.

Mr. Moon was then asked whether sandwich courses gave a better link between education and training than an end-on one year training following three years of study. He said that it was impossible to generalise, although sandwich courses did appear to help some people to see the relationship between practical and abstract concepts. Mr. Moon added that it was valuable to experiment with different patterns of course structure and thought it regrettable that many polytechnics were copying traditional university patterns in order to

gain academic respectability instead of trying to establish new traditions.

Several members protested that it was a waste of resources to train women in engineering skills as they would almost certainly leave fairly soon to have families. Mr. Moon replied that this was not in fact true. The average length of appointment of most technologists in the companies which trained them was less than three years, while women technologists remained in the companies where they were trained for seven years.

R H Fox, Head of Further Education Department, CGLI

"I was invited to comment upon our plans for the next five years. This is a short time for FE, but a long time for industry. What I shall say is not a definitive statement of CGLI policy but a personal view of some of the developments which may be taking place over the next few years. Nearly a century ago the CGLI was set up for the advancement of technical education in the service of industry. This remains our objective today.

The fact that the CGLI is an independent body has certain advantages. We do not, for example, have to produce five year plans for approval by external agencies, nor produce budgets for approval by government departments. The Institute is, however, open to criticism and has to justify itself in the quality of the service it provides.

While we are independent in the sense of not having to do as others tell us, if we did not respond to others we would have no further reason for existence. Our plans are, therefore, dependent upon a number of external factors and influences."

Mr. Fox identified five main areas which influence CGLI policy:

(1) Government policies, Government departments, changes in the Government's approach to education and training and the amount of money it makes available for it, and so on. The setting up of bodies such as the TSA and TEC have a substantial influence.

(2) The state of industry. One of the platforms of the CGLI has always been the connection that it seeks to maintain with industry. The attitude of industry to education and training and the extent to which recruitment and employment patterns may change over a period of time have a great effect upon the work of the Institute.

(3) General financial pressures. As inflation pushes costs up the CGLI has to look more carefully at its expenditure on marginal activities and decide whether it can continue them on the present basis.

(4) Changes in social behaviour and attitudes, for example: changes in the views people hold about the purposes of training and education;

the tendency to remain in full time education for longer - these and similar trends influence CGLI's work.

(5) Developments in educational theory and practice such as modular course structures, credit or referment systems, college based schemes, new attitudes to examining.

TEC

Commenting on the Institute's relationship with TEC, Mr. Fox reminded the conference that over the next five years the technician education and training which had formerly accounted for a large part of CGLI's work would become TEC's responsibility. By the end of the period there would be few, if any, industrial activities where TEC programmes had not started, and CGLI would have ceased to offer examinations at the lower levels of most of its technician schemes. During the next five years, therefore, CGLI would be evolving a sensible relationship with TEC, both in terms of policy formation and administration.

The coming five years would also see a review of the examination schemes which remained under the aegis of the Institute. These were mainly at craft level and accounted for about two thirds of the present work. One factor in particular would affect developments over the next five years - industry's increasingly critical view of the content and approach to craft training in FE, particularly in the initial stages. ROSLA and the growing tendency of industry to pay full rates for the job by the age of 18 or shortly after meant that opportunities for day release after the age of 18 were only likely to occur where industry was quite satisfied that it was getting value for money.

Over the next two or three years CGLI would be looking at the entire structure of its advisory committees for craft schemes with the intention of improving the relationships it had with industry.

Mr. Fox then indicated several new areas of work in which the CGLI might become involved in the near future.

"First, there is the possible development of foundation courses - vocationally-biassed syllabuses and examination schemes for people in full time education mainly 16+ "school leavers". Pilot studies are being carried out and if there is found to be a need, they will be further developed over the next five years.

Secondly, the CGLI is interested in new types of testing. Industry has shown an increasing interest in proficiency tests designed to give some indication of whether recruits are actually capable of doing jobs in industry. Many are now coming to believe that the separation of industrial training from education has led to some regrettable consequences. One possible way to regain the confidence of industry might be to create a system of certification which links attainment in further education courses with performance in industry-based proficiency tests.

The CGLI is also interested in continuing to develop and improve examination and testing techniques generally - objective tests, the pre-testing and banking of traditional examination questions, various forms of in-course assessment, the validation of college based examinations.

The Institute will continue to seek to improve the way in which syllabuses are presented. Some work has already been done but more is needed. I believe that colleges would welcome it.

Some might question whether CGLI in fact has five more years left for which to make plans! I believe that we have much more than that. Our centenary is in 1978. I see no reason why in 103 years time we should not be celebrating a second centenary."

Syndicate Discussion

Mr. Fox was asked to describe the CGLI Foundation course. He told the group that it was a pilot study being carried out in order to help the Institute decide whether it had any contribution to make in the field of post-16 full time vocationally biassed courses. The approach would be on a 'whole course' basis rather than separate subjects such as the CSE system. There could, however, be variations. The vocational bias could be in a number of alternative activities. The course could serve a number of purposes, such as helping people who cannot or do not wish to get a job immediately move a step nearer to deciding on the type of work they wanted to do and acquire some vocational skills, and thus provide a bridge from full time education into the world of work.

Some members were concerned at the loss of time that the course would entail. Students would not complete it until they were over 17 and would still not possess a basic certificate. It was suggested that the course would be better taken at the age of 14 or 15. Mr. Fox explained that the course was designed solely for young people who had not decided what they wished to do. Those who already had a career in mind would not take it. A member suggested that it would be an advantage if the course gave exemption from parts of other FE courses which students might want to take later.

On the future of craftsmen, one member asked Mr. Fox whether he thought this grade might disappear. He replied that as labour became more and more costly and technological developments took place, craft jobs might disintegrate into a number of operative skills. At the other end of the spectrum, more technicians would be needed to cope with advanced machinery. But these were only assumptions and the process of change would in any case take many years.

Would craft courses lead straight to technician activities and courses in the future? Mr. Fox thought they would - but only for a limited number of people. Therefore craft courses should not be allowed to become merely preparation for technician courses. Those people who would later become technicians should have a bridging course between the craft course and the technician course if necessary, as it was unjustifiable for all craft students to study subjects which would be relevant to only a few.

Would CGLI courses develop on modular lines? Mr. Fox did not envisage unit systems of the TEC type for craft courses in general, although it might be useful in some subjects, especially at Part 3 level.

Finally, Mr. Fox was asked to comment on the idea of a single body replacing GCE boards, TEC, BEC, CGLI and so on in order to rationalise the use of resources. He replied that a centralised agency such as this might work within the area of technical education, and could include professional bodies. The danger was that it might be too monolitic and stifle curriculum development. He did not think it would be possible to include examining bodies concerned with general education in such a structure.

Mr Macqueen

Syndicate Discussion

The first point which the syndicate raised with Mr. Macqueen concerned technicians. At present, the Construction Industry did not seem to attract many of these. What would be the future policy of the CITB with regard to this? Replying, Mr. Macqueen spoke of the tradition in the industry for many technicians to come from the ranks of the craftsmen. Such people generally in addition to craft studies took an HNC or even an Institute of Building qualification. It was thought that the time spent becoming a craftsman was not wasted. The main problem nowadays was in finding people of sufficient calibre to make technicians among the ranks of craftsmen. People with this level of ability tended to remain at school longer. The CITB wanted to ensure that craft courses were not seen simply as an end in themselves, but possibly for individuals a step to something higher, and had supported technician courses in many specialist fields.

Mr. Macqueen agreed with a member who suggested that when classes were not viable in terms of student numbers, they should be joined together. He deplored the concern of many teachers with the purity of their particular subjects. Then he referred to one of the main problems of technician and craft training in his industry - the fact that it covers such a variety of different jobs. It was impossible to teach every single specialism. Therefore an attempt had to be made to teach the students in such a way they could themselves apply what they had learned to their particular jobs.

Syndicate Reports

The syndicates agreed that the general range of courses would remain substantially the same, TEC notwithstanding, although the need for rationalisation and flexibility would possibly affect the organisational structure within and between colleges.

CNAA courses

One syndicate paid substantial attention to degree courses. It reported that while employers seemed to have a continuing preference for thin-sandwich courses, colleges were being driven by expediency towards full time and thick-sandwich courses. The advantage of these were the fuller utilisiation of resources by the colleges and flexibility in the placement of students for industrial training. Statements of entry qualifications were being interpreted in a variable and liberal manner and the trend was for acceptable competition for students. It was suggested that entry to technology degree courses should be open to students who had passed at 'A' level either mathematics or a science subject in combination with at least one other acceptable subject. Every review of student entry qualifications to advanced courses indicated that there was a lack of resources to enable the adequate teaching of numerate subjects in schools. It was suggested that suitably qualified FE staff should be prepared to co-operate actively with local schools to ameliorate current shortages of teachers of numerate subjects in schools.

Open University

Members suggested that there might possibly be an extension of Open University style courses, and TEC courses might even make use of some existing OU units. There might be further development of non-vocational courses in technology along OU lines.

technician courses

It was felt that the introduction of TEC courses would result in a rationalisation of work in colleges and one syndicate believed that this would mean a reduction in the number of establishments involved in higher level work. Core subjects for the lower level awards should be made available in many colleges but very specialised units should be confined to specific colleges. This pattern would result in increased co-operation between neighbouring colleges and in time might lead to evening courses for specialised modules in specialist subjects. Another syndicate reported that technician courses would certainly change from the administrative viewpoint and in the unit approach to certification as a result of TEC. However, unless industry was prepared to actively co-operate witn colleges, members of this group saw little change in subject matter or syllabus content from that of existing technician courses.

One group thought there was a need for clarification of TEC's statement that

> "a student who meets the admission requirements for a programme and studies reasonably hard and well, should be entitled to expect that he will be successful in his studies."

This led into discussion about entry qualifications and methods of assessment - particularly where there was reduced emphasis upon formal examinations. It was envisaged that standards for a given programme would vary considerably unless programme committees gave guidance to ensure consistency. It was recommended that lecturers become involved in the decision-making procedure of the programme committees and the syndicate noted that it might be necessary to establish and work through informal channels.

craft courses

Syndicates held different opinions regarding the likely future structure of craft courses. One group thought that a unit system, possibly integrated with the TEC system, was likely to be considered. Another syndicate did not foresee a modular approach of any kind being acceptable. A third group, whilst accepting Mr. Fox's indication of little change in CGLI craft level provision over the next five years, thought that in the longer term, as technology developed, it would become more operator-biassed. One group envisaged that additional part time courses might be developed to supplement local industrial skills or sub-skills where they were not at present catered for in the usual craft courses.

trade principles

One syndicate thought the expansion of the Yorkshire Trade principles courses likely and desirable. It was suggested that it ought to have certification on a national basis.

foundation courses

Several groups considered the development of courses for 16 year old school leavers with no committment to an employer highly likely, especially in view of the gloomy employment prospects of the near future. Such courses ought to give exemption from various part time and full time craft scheme units. One syndicate noted that the CGLI Foundation Courses would be more suitable for students of 15+ rather than 16+ as those leaving the present courses would be 17+ and employers might be unwilling to offer them apprenticeships at this age. Another group indicated that these courses might be suitable only for those students who would later be employed in "fringe" areas of the industry, such as storekeeping. One group regretted that the CITB, unlike the EITB, did not look favourably upon pre-apprenticeship courses.

link courses

Two groups envisaged the expansion of link courses, possibly related to TEC units.

short courses

There was likely to be a growth in the demand for specialised short courses, particularly those with a vocational bias.

general studies

One syndicate felt that general studies was an essential element in any future engineering and technology course, provided it was structured and related to the needs of both the individual student and the employer. Another group suggested that the weakness of present trends in the teaching of liberal studies would probably lead to the increased involvement by teachers of vocational subjects, and this might result in more structured courses.

day release

Members indicated that present financial restrictions would delay the introduction of day release on request until after the next five years and would also inhibit the introduction of new courses which did not replace existing courses.

college response

In view of the above factors, members considered that colleges would have to review the length of the college year; the funding of courses; staffing policies to account for new conditions of service; the use of staff for activities such as counselling and curriculum development; staff development; and changes in college structures from departmental organisation to faculty and matrix systems. Colleges must also be amenable to course-sharing activities and allow rationalisation . Members thought that there would have to be some cross-training of staff and perhaps the sharing of specialist staff amongst a limited number of colleges.

One group summed up the prime objective for the next five years as the setting up of genuine working partnerships between Industrial Training Boards, the Training Services Agency, TEC, the CGLI and the FE service, in order to combine education and training philosophies and develop an integrated approach.

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BIBLIOGRAPHY

Coombe Lodge Reports	Developments in technician education (TEC)	Vol.7. No.3. 1974.
	The organisation of engineering education.	Vol.7. No.1. 1974.
	City and Guilds examinations. Present developments and future possibilities.	Vol.6. No.8. 1973.
East Anglian Regional Advisory Council for Further Education	Technicians within the construction industry. Recommendations for their education and training. Based on a survey in East Anglia by a working party of the building sub-committee. East Anglian Regional Advisory Council, Autumn 1973.	
	Employment and Training Act 1973. Chapter 50. H.M.S.O., 1973.	
Engineering Industry Training Board	Research Report No.1. The technician in engineering. Report of a survey of the employment, recruitment and qualifications of technicians in the engineering industry 1969. Engineering Industry Training Board 1970.	
Engineering Industry Training Board	Research Report No.2. The analysis and training of certain engineering craft occupations. Engineering Industry Training Board 1971.	
Engineering Industry Training Board	Research Report No.3. Changing technology and manpower requirements in the engineering industry. Sussex University Press in association with the Engineering Industry Training Board 1972.	
Manpower Services Commission	Training Services Agency. A five year plan. H.M.S.O., 1974.	
Technician Education Council	Policy statement. T.E.C. June 1974.	

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